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The Use of Special MMPI Scales for Prediction of Response to Chemical Dependency Treatment

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THE USE OF SPECIAL MMPI SCALES FOR PREDICTION OF RESPONSE TO CHEMICAL DEPENDENCY TREATMENT

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Signature James H Thowes

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ABSTRACT

The purpose of this study was to investigate how selected special scales of the Minnesota Multiphasic Personality Inventory (MMPI) are related to treatment completion and treatment outcome in a privately operated chemical dependency treatment program. Multiple regression analyses, discriminant function analyses, and canonical correlation were used to analyze the data.

In Part I of this study the MMPI scales of Lie, K, Conscious Anxiety, Conscious Repression, Dependency, Dominance, Control, Admission, and Denial were examined to determine their ability to predict treatment completion for 182 males and 48 females. Completion of treatment was associated with lower scores on the Conscious Repression scale and higher scores on the Control scale. Male completers also had higher Dependency scores, while female completers tended to score lower on the Dependency scale than those who did not complete treatment. However, the selected scales seem to be of limited value in predicting treatment completion because they accounted for a relatively small proportion of the variance.

Part II of this study examined treatment outcome in groups of patients at 1, 6, or 12 months following completion of treatment. Self-reports of chemical use, informant reports of chemical use, employment status and the number of admissions to a detoxification facility were

used as measures of post treatment adjustment. Improvement was most consistently associated with lower scores on the Admission and Hypomania scales of the MMPI and more frequent attendance at Alcoholics Anonymous meetings.

INTRODUCTION

The problems of predicting which patients will benefit from alcoholism treatment and identifying those who will leave a treatment program prematurely have concerned many investigators (Clopton, 1978). In a review of the literature on drop-out from treatment, Baekeland and Lundwall (1975) reported a 28% premature withdrawal rate from inpatient alcoholism treatment programs. Emrick (1974) reviewed studies assessing the effectiveness of alcoholism treatment and reported that about 33% of the patients who complete treatment fail to show improvement in their overall drinking rate. These reviews clearly show that failure to complete and respond to alcoholism treatment are widespread problems in the field of alcoholism research.

If early terminators and individuals who fail to respond to a treatment program could be distinguished in advance from those who have a successful recovery, there could be important implications for alcoholism treatment. Greater effort could be directed at influencing premature terminators to stay in treatment, or programs could be modified to deal more effectively with those who complete treatment, but fail to achieve or maintain gains during treatment. Where treatment resources are limited, therapeutic efforts might be focused on those with the best prognosis, or selection policies might be modified to choose patients most appropriate for a particular program.

A variety of personality assessment techniques have been used in research on alcoholism, including the Tennessee Self-Concept Scale, the Personality Research Form, the Edwards Personal Preference Schedule, the Eysenck Personality Inventory, the Sixteen Personality Factor Questionnaire, the Gough Adjective Check List, and the Minnesota Multiphasic Personality Inventory (MMPI). The results of these studies demonstrate a lack of agreement about the personality characteristics of alcoholics, as well as a lack of success in predicting improvement during treatment or drinking behavior following treatment (Neuringer & Clopton, 1976). Further, these tests have shown few or no differences between alcoholics who complete treatment programs and those who terminate prematurely (Clopton, 1978).

Of the personality assessment techniques which have been used in alcoholism research, the MMPI appears to be of greatest utility for predicting treatment outcome variables. It is widely used for evaluation of individuals in alcohol treatment programs and has been the dominant personality research instrument used with alcoholic populations (Clopton, 1978).

The purpose of the present study is to determine whether or not selected special scales of the MMPI are predictive of completion and response to treatment in an inpatient alcoholism treatment facility. This paper will first review the literature on the clinical and validity scales of the MMPI which have been used to predict completion of alcohol treatment programs or response to treatment. Next it will examine how various special scales from the MMPI are related to alcoholism.

Finally, it will review the literature on special scales derived from the MMPI to predict alcoholism.

The Clinical Scales

When the 10 clinical scales of the MMPI have been used in alcoholism research, the average MMPI profile for alcoholics has most frequently shown the highest elevations on the Psychopathic Deviate (Pd) and Depression (D) scales (Clopton, 1978). Other investigators (Bean & Karasievich, 1975; Donovan, Chaney, & O'Leary, 1978; Goldstein & Linden, 1968) have identified several distinct MMPI profiles common to alcoholic populations. Despite their prevalence in the literature, studies attempting to relate scores on MMPI clinical scales to treatment completion have usually been negative in their findings (McWilliams & Brown, 1977; Miller, Pokorny, & Hanson, 1968; Mozdzierz, Macchitelli, Conway, & Krauss, 1973; Wilkinson, Prado, Williams, & Schnadt, 1971).

Of the 8 studies which have explored the relationship between MMPI clinical scales and treatment completion, only 2 have found a relationship. Huber and Danahy (1975) studied patients admitted to a 90 day Veterans Administration (VA) alcoholism treatment program and found that Pd was higher for noncompleters (*M* 75.43, *SD* 10.77) than completers (*M* 70.31, *SD* 10.39). The authors noted that the variance of the groups makes the finding of limited use in a clinical setting. As a group, the patients with the most elevated profiles were the ones who did not complete treatment.

Hoffman and Jansen (1973) examined MMPI scores of alcoholic patients admitted to a state hospital. Subjects were segregated into 5

groups according to type of discharge: Provisional Discharge, With Medical Advice, Against Medical Advice (AMA), Absent Without Leave (for voluntary patients), and Unauthorized Absence (for committed patients). A one-way analysis of variance showed significant differences for the 5 groups on the Hypomania (Ma) scale.

Eight studies have used the clinical scales of the MMPI to predict drinking behavior following treatment and two have reported significant results. Pokorny, Miller, and Cleveland (1968) studied inpatients who completed a 90 day VA alcoholism treatment program. Of the 206 patients who completed treatment, 88 were available for a one year follow-up. These cases were split into 45 improved and 43 unimproved (in terms of drinking behavior). There were no significant differences at the one year follow-up. When the 22 abstinent patients in the group were compared with the 22 patients judged to be the heaviest drinkers, they found the abstinent subjects had significantly lower Ma scores. Trice, Roman, and Belasco (1969) reported a significant negative correlation between Pd and a rating of global adjustment after treatment at a state hospital.

Kish and Herman (1971) failed to find a relationship between MMPI clinical scales and improvement in drinking behavior at 3, 6, or 12 month follow-ups with a VA population. Muzekari (1965) found that the MMPI clinical scales were not able to differentiate alcoholics who had abstained for a year or more from those who had relapsed after treatment. Cripe (1974) found that MMPI scores were not related to abstinence in alcoholics at a 6 month follow-up.

Tomsovic (1970), Bean and Karasievich (1975), and Gellens, Gottheil, and Alterman (1976) classified alcoholics by various MMPI profile types, but were not able to find differences in drinking behavior between groups on follow-up.

The Validity Scales

Studies which have used the validity scales, Lie (L), Frequency (F), and Correction (K), for predicting outcome of treatment have produced inconsistent results. Krasnoff (1976) found that inpatient alcoholics who completed a state hospital treatment program had significantly higher L scores than those who dropped out. Hoffman and Jansen (1973), cited previously, found that five groups of patients with specific discharge types differed significantly on L scale scores.

In contrast, several investigators working with VA hospital populations have failed to find a relationship between L scores and length of stay in treatment (Miller et al., 1968; Wilkinson et al., 1971).

Although no studies have found a relationship between the F scale and treatment results, a few studies have demonstrated a relationship between the K scale and type of discharge from treatment. Mozdzierz et al. (1973) found that patients who left a 6 week VA treatment program against medical advice scored higher on K than non-AMA patients. Hoffman and Jansen (1973) reported that the groups in their study differed significantly on the K scale. Other investigators (McWilliams & Brown, 1977; Miller et al., 1968; Wilkinson et al., 1971) have failed to find a relationship between treatment outcome variables and K scores.

In summary, despite the presence of some research in the area, to date no consistent relationships between the validity scales and treatment outcome appear to be established. Patients who complete an alcoholism treatment program might be expected to score higher on L and lower on K than patients who terminate treatment prematurely. Further research may be useful in clarifying the relationship between the validity scales and treatment outcome variables.

Special Research Scales of the MMPI

In addition to the standard clinical and validity scales, numerous other scales have been constructed from the basic MMPI item pool. Dahlstrom, Welsh, and Dahlstrom (1975) present 455 additional scales which have been developed by various investigators, ranging from measures of promiscuity to predictors of success in religious vocations. The scales differ greatly in their manner of construction and the degree to which they have been cross-validated. Most of the additional scales have not been cross-validated adequately and, therefore, are not suitable for use in a clinical setting (Graham, 1977).

Although the "new" or special scales of the MMPI have existed for a number of years, they are infrequently encountered in research literature. Their reliability and validity as clinical indicators are still tentative because these scales have not been subject to the exhaustive evaluation that occurred in the development of the clinical and validity scales.

The present study will focus on the use of special MMPI scales for the prediction of response to alcoholism treatment, and this section

will examine selected special scales that have been used to study alcoholism. The special scales most often encountered in alcoholism research are Conscious Anxiety, Repression, Admission, Control, Dependency, Dominance, Denial, and Ego Strength.

Conscious Anxiety (A)

Welsh (1956) factor analyzed the MMPI and derived the A scale as a measure of the first factor of the MMPI. The A scale seems to be a measure of the amount of overt anxiety present when the test is taken and represents short term, situational anxiety. It is strongly related to indices of overt anxiety and is an indication of tension, nervousness, and distress (Duckworth & Duckworth, 1975).

A variety of studies have established a relationship between the A scale and situational anxiety. Sheriffs and Boomer (1954) reported that high A scorers showed more self-doubt in examination situations. Lewinsohn (1965) reported that A scores tend to show a decrease during psychiatric hospitalization.

Button (1956) first applied the A scale in a study of alcoholism. He examined MMPI scores of alcoholics committed to a state mental hospital and found that their A scale scores were close to that reported for Welsh's (1956) normative population. Barry, Anderson, and Thomason (1967) examined the relationship between A scores, marital adjustment, and alcoholism in a group of patients who voluntarily entered a state alcoholic rehabilitation center. They found that those rated as well adjusted in their marriage scored lower on A than those rated as poorly

adjusted. No attempt was made to relate marital adjustment or conscious anxiety score to treatment outcome.

In a study of alcoholics in a 90 day VA inpatient treatment program Wilkinson et al. (1971) found no difference in the A scale scores of completers and drop-outs. However, it was found that completers showed a significant decrease on A during treatment.

McWilliams and Brown (1977) classified hospitalized alcoholics into three groups: (1) completers who received a problem free discharge, (2) completers who received a provisional discharge, and (3) non-completers. There were no significant differences in the A scale scores of the groups prior to treatment. A comparison between pre- and post-treatment scores for the groups who completed treatment showed a significant decrease in A scale scores, indicating that these patients were less anxious after completing treatment.

A summary of the A scale research indicates that alcoholics, like psychiatric patients, show a decrease in A scores during treatment. Due to the limited number of studies with the A scale further research to examine its status as a predictor of treatment outcome would be useful.

Conscious Repression (R)

Welsh (1956) developed the R scale as a measure of the second factor in the MMPI. This scale consists of 40 items keyed false and appears to measure the use of denial and rationalization as coping behaviors. A high score on R indicates the individual is submissive, unexcitable, and conventional. He may be saying that there are areas of his

life he does not wish to talk about, a conscious suppression of information (Duckworth & Duckworth, 1975).

The status of the R scale as a clinical indicator is not well established. Lewinsohn (1965) found no significant changes during psychiatric hospitalization. Block and Bailey (1955) reported that males who scored high on R readily made concessions rather than face unpleasantness of any sort. Other investigators (Abbott, Fry, & Abbott, 1972; Edwards & Abbott, 1972) propose that R is a measure of acquiescence. Since all items on the R scale are keyed false, R scores may measure the tendency to acquiesce (mark true) to MMPI items.

In Button's (1956) study, court committed alcoholics obtained mean R scores close to that of the general population. The R scores reported by McWilliams and Brown (1977) on alcoholics in a state hospital program were also near the mean of the normative MMPI sample. The R scale failed to discriminate between completers and non-completers and showed no significant change during treatment for the completers.

There is little evidence available about the relationship between R and alcoholism treatment outcome. However, several investigators (Duckworth & Duckworth, 1975; Welsh, 1956, 1965) suggest that A and R scores should be considered conjointly when interpreting profiles to gain a more complete understanding of the individual. They present descriptions that characterize individuals with various A and R profile combinations. Because the relationship between A and R may be important in interpreting profiles it seems appropriate to include R scores in multivariate research where the A scale is used.

Admission (Ad)

The Admission scale was derived from a cluster analysis of the Hysteria scale of the MMPI by Little and Fisher (1958). High scorers on this scale are in general psychological distress, complain about somatic functions, and report disturbances in object relationships. They usually have an overall elevation on the clinical scales (Little & Fisher, 1958).

There is little information available on the use of the Ad scale in the research literature. Block and Thomas (1955) reported a significant negative correlation between Ad scores and a measure of self-satisfaction. The self-satisfaction score was obtained using a Q-sort procedure on a list of 80 adjectives and comparing the self-sort description of each subject to his ideal self-sort.

Truax (1957) studied the effect of anxiety induced by implied failure and found that repressors scored high on a Hysteria-Psychasthenia index, while nonrepressors scored low on this index. In a footnote the author reported that the Ad scale contributed 53% of the Hysteria score for the nonrepressors, but only 6% of the Hysteria score for the repressors.

Two investigators have used the Ad scale in the study of alcoholics. They used different populations of alcoholics and arrived at inconsistent results. Mozdzierz et al. (1973) studied male veterans in a 6 week inpatient alcoholism treatment program. They matched a group of patients who left against medical advice with non-AMA patients on the

variables of age, education, and marital status. Patients who left AMA scored significantly lower on Ad.

In contrast, Krasnoff (1977) examined MMPI scores of patients in a 6 week state hospital program, but failed to find a difference between completers and drop-outs on the Ad scale.

There has been little research with the Ad scale and its utility as a predictor of treatment outcome is unclear. Further research with this scale seems necessary to clarify its value as a predictor.

Control (Cn)

The Cn scale was developed by Cuadra (1956) as a measure of personality control. He noted that inpatients and outpatients may be found who do not appear to differ greatly from one another in terms of overall psychopathology. He reasoned that the essential difference between persons with equal psychopathology who are hospitalized rather than treated as outpatients is that the outpatients have more control over the expression of their pathology. He matched patients who were similar in terms of age, sex, and MMPI profile elevation and configuration. However, one member of each pair was hospitalized for psychiatric treatment while the other was receiving outpatient psychiatric treatment. Cuadra's (1956) scale consists of 50 MMPI items which best discriminated between the two groups, with non-hospitalized patients scoring higher. No validity studies of the Cn scale have been reported.

Two studies have reported the use of the Cn scale with alcoholics. Wilkinson et al. (1971) found that Cn was the only MMPI scale that correlated significantly with completion of a 90 day VA alcoholism

treatment program. Those who completed the program scored lower on Cn than those who terminated prematurely.

Krasnoff (1977) found no significant differences on the Cn scale between completers and drop-outs in his study of alcoholics in a 6 week state hospital program. He suggested that the discrepancy with the findings of Wilkinson et al. (1971) may be due to population differences, program length, or merely a statistical artifact.

Despite some research with the Cn scale, its status as a predictor of treatment outcome is unclear and there is a need for further research with this scale.

Dependency (Dy)

Dependency is a rationally derived scale (Navran, 1954) designed to assess the strength of dependency needs. High scores on the Dy scale tend to be associated with general psychological maladjustment (Graham, 1977). A conflict about dependency needs is suggested when an individual has a high Dy score but his behavior is not indicative of strong dependency needs. High scorers admit to strong dependency needs, feel misunderstood and unhappy, and lack self-confidence. They are likely to have very strong dependency needs that are not being fulfilled adequately (Graham, 1977).

Several researchers have reported Dy scores obtained with client populations. In his original article Navran (1954) reported that psychiatric patients scored significantly higher on Dy than normals. Pruitt and Van deCastle (1962) found that higher Dy scores were associated with greater chronicity among welfare recipients. They also reported that an

unpublished study by Nelson (1959) indicated that Dy scores were not predictive of length of therapy, but that high Dy scorers were more likely to continue in therapy for at least one session after an initial intake interview.

Button (1956) found that alcoholics scored lower on Dy than neuropsychiatric patients, but not significantly higher than normals, although the drinking behavior and projective test results of alcoholics suggested strong dependency trends.

Rhodes and Yorioka (1968) compared alcoholic and non-alcoholic patients in a tuberculosis sanitarium on two measures of dependency. Although there was no difference in Dy scores between the groups, both groups obtained considerably higher scores than non-patient control groups described elsewhere in the literature.

Mozdzierz et al. (1973) found that patients who left a 6 week VA alcoholism treatment program against medical advice scored lower on Dy than non-AMA patients. In contrast, Krasnoff (1977) reported that completers and drop-outs did not differ on Dy scores in a state hospital treatment program.

McWilliams and Brown (1977) found that Dy scores failed to discriminate between completers and non-completers in a state hospital program, but reported that completers showed a significant decrease in Dy scores during treatment.

Dependency is often emphasized as a motivational or descriptive variable in the psychological literature about alcoholism (Blane & Meyers, 1963; Tarnower & Toole, 1968) and because the literature reviewed is inconsistent in its findings, it seems appropriate to

continue research on the relationship between the Dy scale and alcoholism.

Dominance (Do)

Gough, McClosky, and Meehl (1952) developed the Do scale, which measures poise and self-assurance, by the "peer group nomination technique." College and high school students were asked to nominate members of their respective groups whom they considered to be the most and least dominant. The Do scale consists of items that best differentiated between most and least dominant subjects. The items are keyed in such a way that a high score on the Do scale is suggestive of high dominance. It is an indication of a person's ability to take charge of his or her own life (Duckworth & Duckworth, 1975). High scorers seem to be self confident, poised, self-assured, and appear free to behave in a straightforward manner (Graham, 1977). Low Do scorers seem to be submissive, unassertive, and easily influenced by other people (Graham, 1977).

Several validity studies have used the Do scale with non-client populations. Knapp (1960) reported that Marine Corps officer pilots scored significantly higher on this scale than enlisted men. However, Olmstead and Monachesi (1965) reported that the Do scale failed to differentiate between firemen and fire captains. Eschenback and Dupree (1959) reported that Do scores did not change as a result of situational stress. Anderson and Duckworth (1969) reported that college students tend to score high on Do, with a mean T score of 60.

McWilliams and Brown (1977) are the only investigators who have examined the Do scale with an alcoholic population. They failed to find

a difference between completers and drop-outs in a state psychiatric hospital.

There seems to be room for further research with this scale. Do also has a special relationship with the Dy scale. In general when Do is high, Dy is low and benefits can often be obtained by interpreting the scales in conjunction with one another (Duckworth & Duckworth, 1975). Therefore, it may be useful to examine both scales in a multivariate context.

Denial (Dn)

The Dn scale was derived from a cluster analysis of the Hysteria scale by Little and Fisher (1958). The items for this scale are keyed so that a high score reflects a tendency to deny unfavorable characteristics about one's self. High scorers on the Dn scale are generally uninsightful, anti-intraceptive, and morally virtuous. They often have "muted" or pseudo-normal profiles (Little & Fisher, 1958).

There is little information available on the use of the Dn scale. Block and Thomas (1955), cited previously, reported a significant positive correlation between the Dn scale and a measure of self-satisfaction obtained from a Q-sort procedure. They found that individuals who expressed extremely high congruence between self and ideal-self had significantly higher Dn scores than subjects who reported a more moderate level of self-satisfaction. They concluded that expressions of extreme self-satisfaction on Q-sort procedures "represents an unhealthy tendency to deny too vehemently the human condition" (Block & Thomas, 1955, p. 255).

Two studies have used the Dn scale to study alcoholics. Mozdzierz et al. (1973) found that veterans who left a 6 week alcoholism treatment program against medical advice scored significantly higher on the Dn scale than non-AMA patients. Krasnoff (1977) found no differences between completers and drop-outs with a state hospital population.

The status of the Dn scale as a predictor is unclear and more research seems necessary to clarify its relationship to alcoholism treatment.

Ego Strength (Es)

The Ego Strength scale was developed by Barron (1953) to predict the response of neurotic patients to psychotherapy. The Es scale items deal with physical functioning, seclusiveness, attitudes toward religion, moral posture, personal adequacy, and ability to cope (Welsh & Dahlstrom, 1956).

High scorers on the Es scale seem to be stable, responsible, tolerant, and self-confident. They are alert, adventuresome, persistent, have a secure sense of reality and can tolerate confrontation in psychotherapy (Graham, 1977). Low scorers on Es tend to be less well adjusted psychologically than high Es scorers. They have a poor self-concept, feel helpless and confused, and may be withdrawn and inhibited (Duckworth & Duckworth, 1975).

In reviewing the literature on the Es scale, Graham (1977) reported that attempts to cross-validate the scale as a predictor of response to psychotherapy have yielded inconsistent findings. Some studies show that psychiatric patients who change most during treatment have

higher pretreatment Es scores, while other studies suggest that change in treatment is unrelated to Es scores. He concluded that the relationship between Es scores and treatment outcome is not a simple one and that the kind of patient, type of treatment, and nature of the outcome measure may be important factors.

The Es scale has been the most widely used special scale in alcoholism research. Ends and Page (1959) examined Es scores in assessing the effectiveness of group therapy with alcoholics. Both experimental and control groups were patients in a 60 day state hospital treatment program which consisted primarily of lectures covering psychological, physical, social, and spiritual problems associated with alcoholism; a thorough grounding in Alcoholics Anonymous (AA) principles, AA participation, and discussion groups. In addition to this program, the experimental groups received either 15 or 30 sessions of Rogerian group-centered psychotherapy. The experimental groups showed greater therapeutic change during treatment than control groups, as measured by pre- and post-treatment Q-sorts of self and ideal self. However, both experimental and controls showed an increase in the Es score during treatment.

Sinnett (1961) studied patients in a 90 day VA alcoholism program in an attempt to identify those who would leave treatment prematurely. He found no differences between completers and non-completers on the Es scale or on the demographic variables of age, education, or occupation.

Barry, Anderson, and Thomason (1967) examined the relationship between marital adjustment and alcoholism and found that alcoholics

rated as well adjusted in their marriage scored higher on Es than those rated as poorly adjusted in marriage.

Fowler, Teel, and Coyle (1967) examined the Es scores of male alcoholics in a voluntary outpatient program. Scores were not related to completion of treatment or to improvement in drinking. They concluded that the Es scale is not useful for identifying those alcoholics who will continue in outpatient therapy.

In a study of alcoholics in a 90 day VA program Wilkinson et al. (1971) found that Es scores were not significantly correlated with program completion. For the completers, however, there was a significant increase on the Es scale during treatment as well as an overall reduction in the elevation of the clinical scales.

Mozdzierz et al. (1973) found no significant differences in Es scores of veterans who left a 6 week program against medical advice and non-AMA patients. McWilliams and Brown (1977) found no significant differences between patients who completed treatment and premature terminators on the Es scale. However, patients who completed treatment showed significant increases in Es scores.

In summary, for those patients who complete therapy, Es scores seem to increase. However, despite the fact that Es was originally developed as an index of prognosis in therapy, it has consistently failed as a predictor of treatment outcome for alcoholics and will not be further studied in this investigation.

The Alcoholism Scales

Because neither MMPI clinical or special scales have shown any consistent ability to predict treatment outcome, it might be useful to search for more homogeneous groups of alcoholics and then attempt to predict treatment outcome for them. One method of placing alcoholics into more homogeneous groups would be through use of alcoholism scales derived from the MMPI. This procedure would be advantageous for clinicians working in alcoholism treatment centers because it would make use of MMPI data which is often available in treatment centers.

Four MMPI scales that have been developed to identify alcoholics appear frequently in the literature: A1 (Hampton, 1953), Am (Holmes scale, cited in Button, 1956), Ah (Hoyt & Sedlacek, 1958), and Amac (MacAndrew, 1965). This section will first briefly review how the four scales were derived and then examine the studies which have been conducted to validate these scales.

The Hampton scale (A1) was developed by contrasting members of Alcoholics Anonymous from the states of Minnesota, Iowa, Kentucky, and Ohio with a population of normals obtained from the Minnesota Testing Bureau and the Ohio Personnel Testing Laboratories. On cross-validation A1 significantly differentiated AA members from normals (Hampton, 1953). According to a content analysis by Finney, Smith, Skeeters, and Auvenshine (1971), individuals who score high on the A1 scale seem unhappy, fearful, insecure, self-conscious, naive, and emotionally labile.

The Am scale (Button, 1956) was constructed by comparing responses of 72 alcoholics committed to a state mental institution with

the normative MMPI sample. It was cross-validated with a sample of 23 alcoholics at the same institution. The content analysis of Finney et al. (1971) described high scorers on the Am scale as rather unpredictable people, puritanical in some ways but not at all in others, trusting others and often disappointed, jealous and sensitive.

The Hoyt-Sedlacek scale (Ah) was derived by contrasting MMPI scores of males from the Mental Health Institute in Independence, Missouri who had been given the diagnosis "chronic alcoholism" with the MMPI normative sample. It was cross-validated by a sample with the same diagnosis of "chronic alcoholism" in a state hospital (Hoyt & Sedlacek, 1958). High scorers appear sentimental, somewhat naive, and impractical. They seem relaxed, unworried, and deny any hostile aggressive impulses (Finney et al., 1971).

MacAndrews (1965) developed the Amac scale by using MMPI items that differentiated outpatient alcoholics from non-alcoholic psychiatric outpatients. On a cross-validation sample it correctly identified 81.5% of the subjects (8.75% were false negatives and 9.75% were false positives). High scorers on the Amac scale are bold, uninhibited, sociable people who use religion and repression to hold their delinquent impulses in check (Finney et al., 1971).

There have been a number of studies examining the validity of these alcoholism scales. Rotman and Vestre (1964) reported on the validity of three of the scales (Al, Am, Ah) in detecting patients with alcohol problems from among admissions to a VA neuropsychiatric hospital. They found no significant differences between alcoholics and non-alcoholics on any of the scales and concluded that these scales were of

little or no use within a psychiatric population. Rich and Davis (1969) compared the ability of the four scales to separate alcoholic inpatients at a state hospital from groups of psychiatric inpatients and normals. All four scales discriminated significantly between groups at the .01 level or higher. When alcoholics were compared to normal controls Al, Am, Ah, and Amac correctly classified 64%, 74%, 65%, and 74% respectively of the males and 23%, 77%, 50%, and 77% respectively of the females. When alcoholics were compared to psychiatric inpatients Al correctly classified 48% of the males and 60% of the females; Am correctly identified 68% of the males and 71% of the females; Ah correctly identified 71% of the males and 50% of the females; and Amac accurately classified 73% of the males and 75% of the females. No data was presented on the percent of false positives and false negatives.

In a sample of male VA patients, Uecker, Kish, and Ball (1969) compared group means of psychiatric inpatients and found that Am and Ah differentiated alcoholics from non-alcoholic inpatients, but that Al did not. They presented no data on the percent correctly identified by the scales. Using essentially the same population, Uecker (1970) found that the Amac scale correctly identified 66.5% of the subjects, with 21% false negatives and 12.5% false positives.

Vega (1971) compared alcoholic inpatients at a VA hospital with psychiatric and normal control groups on the four alcoholism scales. The Al, Am, and Amac scales all discriminated between alcoholics and controls, but Ah did not. The total correct identification for Amac was 71%, with 9.6% false negatives and 19.4% false positives. On Am, the total correct classification was 74%, with 12.5% false negatives and

13.5% false positives. Al correctly classified 76% of the subjects, with 13.5% false negatives and 10.5% false positives. A retest following completion of the 3 month treatment program showed highly consistent retest scores, with no significant changes occurring, suggesting an underlying personality trait of a relatively stable nature.

Rosenberg (1972) reported that Am, Ah, and Amac were significantly correlated with a diagnosis of alcoholism at a VA hospital. He also reported that the Amac score did not correlate significantly with the Ah scale (.03) or Am (.10). In this study Rosenberg noted that the Welsh A scale correlated .89, .09, -.64, and .00 with Al, Am, Ah, and Amac respectively. The high correlation with anxiety explains, perhaps, why the Hampton scale can discriminate alcoholics from normals, but is unable to discriminate alcoholics from psychiatric patients. The low and negative correlations with the Am, Ah, and Amac scales indicates that they are tapping something other than a generally anxious condition.

Panton (1972) matched prison inmates who had been diagnosed as alcoholic with non-alcoholic inmates diagnosed as antisocial personalities and normal controls. Al successfully identified 65.5% of each of the prison groups and 90% of the normals. The Am scale was successful in identifying 86.7% of the normals, but correctly identified only 52.7% of the inmate alcoholics and 44.7% of the non-alcoholic inmates. The Ah scale was not effective in distinguishing between any of the groups, correctly identifying only 50% of the inmate alcoholics, 50% of the inmate non-alcoholics, and 56.6% of the normals. Thus, it appears that Al is fairly successful in identifying alcoholism among sociopathic personality groups and that Am is successful in distinguishing sociopaths from

normals, but is unable to identify the alcoholic syndrome within a group of sociopaths.

In a study comparing groups of institutionalized alcoholics with institutionalized heroin addicts and psychiatric inpatients, Kranitz (1972) reported that mean scores on the MacAndrews alcoholism scale discriminated alcoholics and heroin addicts from non-alcoholics, but not from each other. This suggests that the Amac scale identifies a general addictive propensity. Lachar, Berman, Grisell, and Shooff (1976) reported similar results.

In a study of Canadian alcoholics, deGroot and Adamson (1973) found that the MacAndrew scale correctly identified 89% of the alcoholics in the psychiatric ward of a general hospital, but also incorrectly classified 18% of the other residents for an overall accuracy of 73%.

Apfeldorf and Hunley (1975), working with a VA domicillary population, found that the Am and Amac scales effectively discriminated groups of alcoholics and disciplinary offenders from a group of non-alcoholics. The alcoholic group consisted of 31 alcoholics with records of offenses indicating problem drinking. The offenders were 94 non-alcoholics with records of offenses indicating problem drinking, and the control group consisted of 118 non-alcoholic residents with no record of offenses. The resident was classified as alcoholic on the basis of diagnosis in the medical records.

They reported that when separating alcoholics from controls, Amac correctly classified 62% of the subjects with 7% false negatives and 30% false positives. When comparing disciplinary offenders with

controls the Amac was 63% correct, with 16% of the offenders classified as non-alcoholic, and 21% of the controls as alcoholic.

The Am scale was 66% accurate when separating alcoholics from controls, and 55% accurate in separating disciplinary offenders from controls. There were negligible correlations between Am and Amac, which indicated that they are measuring different facets or dimensions of alcoholism. The authors reported that the Al scale differentiated offenders from controls, but not alcoholics from controls, while the Ah scale failed to make any discriminations. They did not report the percent of subjects correctly classified by these two scales.

When Atsaides, Neuringer, and Davis (1977) compared alcoholics and neurotics at a midwestern VA hospital they found that the Am and Amac scales classified alcoholics more efficiently than the Ah scale. Amac correctly classified 67% of the subjects with 17% false negatives and 16% false positives. Am correctly identified 62% of the subjects, with 18% false negatives and 20% false positives. Ah correctly identified 47% of the subjects with 27% false negatives and 26% false positives.

Two studies have attempted to relate alcoholism scales to treatment variables. Huber and Danahy (1975) failed to find a difference in Amac scores between groups of patients who completed treatment and those who did not in a 90 day VA alcoholism treatment program. Gellens, Gottheil, and Alterman (1976) found no relationship between Amac scores and drinking at 6 month and 2 year follow-ups for veterans who participated in a treatment program where drinking was permitted. However, on the 1 year follow-up high scorers reported more days of drinking as well as more days of intoxication.

This summary of the literature on MMPI alcoholism scales shows that Am and Amac are the scales most consistently capable of identifying alcoholics and differentiating them from normals and psychiatric controls. To date, there is little evidence available to indicate their utility in the prediction of treatment outcome, perhaps because of the limited amount of research. Some interesting possibilities exist, such as using the scales in a multivariate study, or using the scales to select a more homogeneous group of subjects, then attempting to predict treatment outcome for them.

Demographic Variables

There have been a number of studies which indicate that treatment completion and drinking behavior after treatment are related to demographic variables. Kish and Herman (1971), Miller et al. (1968), and Pokorny, Miller and Cleveland (1968) have found that marital variables are related to treatment outcome. In a review of these variables, Emrick (1974) reported that 9 out of 16 studies which examined marital situation at home found a relationship to various measures of drinking behavior of $p < .01$. In this review he also reported similar results for work related variables and post-treatment variables such as participation in Alcoholics Anonymous.

Armor, Polich, and Stambull (1978) studied outcome data on nearly 30,000 clients who entered treatment at 44 comprehensive alcohol treatment centers. They found that sex, age, and religion were important variables in predicting abstention, while sex, marital status, and employment status were most important in predicting problem drinking.

Some studies of the MMPI and alcoholism have presented inconsistent results which might be related to demographic variables. For instance, while Mozdzierz et al. (1973) found differences between completers and non-completers on K, Dn, Dy, and Ad in a VA program, Krasnoff (1976, 1977) failed to obtain parallel results with a state hospital population. Similarly, Krasnoff (1976) and Hoffman and Jansen (1973) found that state hospital patients who completed a treatment program had higher L scale scores, while other investigators (Miller et al., 1968; Wilkinson et al., 1971), working with VA populations have not.

Because of the relationship between demographic variables and treatment outcome, studies which don't control for such relationships may arrive at different conclusions. The results of a study by English and Curtain (1975) supports this idea. They compared MMPI scores of men in three alcoholism treatment programs--A VA hospital, a halfway house, and a state hospital. They found many differences between the groups, even though the program participants were all recruited from the same geographic location. They suggest the development of local norms for any instruments used in evaluation of alcoholic populations.

The results of this review indicate the need for more research to determine whether or not certain of the special scales and/or the alcoholism scales can be used in the prediction of response to alcoholism treatment.

It seems appropriate that a multivariate approach should be used in this type of research rather than searching for a single scale to predict treatment outcome. It might also be useful to examine treatment outcome for more homogeneous groups of alcoholics, such as those

identified by a particular alcoholism scale, a strategy which has not yet been used in alcoholism research.

It is expected that in the present study those who complete alcoholism treatment will score higher on L, A, Ad, and Dy, and lower on K, R, Cn, Do, and Dn.

PART I. TREATMENT COMPLETION

METHOD

Program

The setting for this study was a privately operated chemical dependency treatment center located in northwestern Minnesota. The adult inpatient program includes eleven 1 to 1-1/2 hour group therapy sessions per week, normally led by a counselor who is a recovering alcoholic. The involvement by family members in the program is strongly encouraged. There is a one day orientation program for family members, and four of the group therapy sessions each week are geared toward family participation. Patients are also encouraged to take at least one weekend pass at home prior to completing treatment.

The program also includes 12 one hour lectures each week on physical, social, spiritual, psychological, and family problems associated with alcoholism; personality growth and development, relaxation training and assertiveness training. Individual counseling is offered as staff time permits.

The treatment program is oriented toward a thorough grounding in Alcoholics Anonymous (AA) principles and philosophy. Group AA meetings are held once a week with a visiting AA speaker. Patients are encouraged to attend an AA meeting outside the center once a week, and to read AA literature. All patients are required to complete the first five steps of the "twelve steps of AA" prior to treatment completion.

Subjects

The subjects were 230 individuals who entered the adult inpatient treatment program after December 20, 1977 and were discharged before May 30, 1979. The sample contained 182 males whose ages ranged from 18 to 77 with a mean of 39.5 years and a standard deviation of 13.3 years. Sixty-seven percent were Protestant, 30% Catholic, and 3% of other religious beliefs. Ninety-seven percent were Caucasian and 3% were American Indian or Mexican-American. Eighty-two percent were employed, and 18% were unemployed.

Fifty-seven percent of the males were married, 23% were single, 12% were divorced, 6% were separated, and 2% were widowers. Fifty-one percent were voluntary admissions, 39% entered voluntarily in lieu of committment proceedings or a jail sentence, and 9% were committed for treatment involuntarily. Ninety-four percent of the males reported that alcohol was the only chemical they abused, 2% reported they abused some chemical other than alcohol, and 4% reported abuse of both alcohol and other drugs.

The female group consisted of 48 members. Their ages ranged from 19 to 64 with a mean of 37.8 years and a standard deviation of 11.7 years. Fifty-eight percent were Protestant, 38% were Catholic, and 4% of other religious beliefs. Ninety-six were Caucasian and 4% were American Indian. Fifty-two percent were employed and 48% were unemployed. Forty-eight percent of the females were married, 21% were single, 25% were divorced, 2% were separated, and 4% were widows. Eighty-one percent were voluntary admissions, 13% entered voluntarily in lieu of committment

or jail, and 6% were involuntarily committed. Seventy-five percent of the females reported that they abused only alcohol, 6% reported they abused some other drug, and 19% reported abuse of both alcohol and other drugs.

Procedure

The records of all patients admitted to the adult inpatient treatment program after December 20, 1977 and discharged before May 30, 1979 were examined. From this group of 263, thirty-three were excluded for various reasons. Eighteen were excluded because of incomplete or missing test data (13 of these did not complete treatment, most of these left against staff advice[1] or were AWOL during the first few days of treatment). Six individuals entered treatment two times during the period of this study and their first admission was excluded from the analysis. Three people who were discharged to a hospital were excluded, as were two subjects who could not obtain funding to complete treatment. One person with no history of chemical dependency was excluded. Three counselor trainees who were going through treatment for training purposes were also excluded. This left 230 subjects for the sample group.

The MMPI was administered after detoxification and three days following admission to the treatment program. MMPI scales scored included L, F, K, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma, Si, A, R, Dy, Do, Cn, Ad, Dn, Am, and Amac. Raw scores were used for comparing subjects of the same sex, while non K-corrected T scores were used in analyses

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[1]This group is similar to groups designated AMA (against medical advice) in other studies.

where both sexes were included. Multiple regression analyses, discriminant function analyses, and canonical correlation were used to analyze the data.

RESULTS AND DISCUSSION

Two hundred (87%) of the subjects in the sample completed treatment and were discharged with staff approval. Three subjects (1.3%) were dismissed, 19 (8.3%) left against staff advice (ASA), and 8 (3.5%) went AWOL. The average length of stay for those who completed treatment was 36.2 days.

One hundred and sixty (87.9%) of the males in the sample completed treatment and were discharged with staff approval. Three (1.6%) were dismissed, 14 (7.7%) left ASA, and 5 (2.7%) went AWOL. The average length of stay for those who completed treatment was 36 days.

Forty (83.3%) of the females completed treatment, 5 (10.4%) left ASA, and 3 (6.3%) went AWOL. None were dismissed. The average length of stay for those who completed treatment was 38 days.

The overall drop-out rate (including those for whom test data was not available) was 17.6%. This compares favorably with the mean drop-out rate of 28% for inpatient programs reported by Baekeland and Lundwall (1975). However, the subjects in this study may have been somewhat different because the average length of stay for those who completed treatment was 36.2 days, while the programs reviewed by Baekeland and Lundwall (1975) were typically 60 to 90 days in length.

The means and standard deviations for each of the MMPI scales are presented in Table 1. The male group in this study appears to be similar to other alcoholic populations described by the literature in

Table 1

Non K-Corrected MMPI T Scores

MMPI Scale	Males (N=182)		Females (N=48)		
	Mean	SD	Mean	SD	t
Lie (L)	48.55	7.42	48.19	6.59	.31
Validity (F)	63.19	17.33	61.96	11.79	.47
K (K)	49.67	9.68	51.17	7.75	.99
Hypochondriasis (Hs)	57.95	13.76	56.04	10.01	.90
Depression (D)	70.76	32.90	68.00	13.50	.57
Hysteria (Hy)	60.42	10.83	64.19	11.18	2.13*
Psychopathic deviate (Pd)	70.83	14.58	76.06	16.06	2.17*
Masculinity-femininity (Mf)	57.59	10.20	50.27	12.91	4.17**
Paranoia (Pa)	64.72	12.84	68.77	12.78	1.94
Psychasthenia (Pt)	62.60	12.95	62.64	12.30	.02
Schizophrenia (Sc)	61.02	16.80	62.31	15.12	.49
Hypomania (Ma)	60.20	12.69	59.81	11.21	.19
Social Introversion (Si)	57.66	10.73	59.19	11.43	.86
Conscious Anxiety (A)	56.94	11.48	55.96	11.03	.53
Conscious Repression (R)	49.82	9.68	49.75	10.32	.04
Dependency (Dy)	58.37	10.48	57.35	10.38	.60
Dominance (Do)	44.24	9.26	45.40	10.88	.74
Control (Cn)	53.93	12.45	53.53	11.91	.20
Admission (Ad)	61.44	13.83	60.51	12.14	.35
Denial (Dn)	50.84	10.42	54.18	8.76	2.03*
Holmes Alcoholism (Am)	73.34	9.83	76.51	11.49	1.91

*$p < .05$, two-tailed
**$p < .001$, two-tailed

that the group average MMPI profile had the scales of D and Pd as high points (Clopton, 1978).

The female group average profile had the Pd scale as a high point, which is also often found in alcoholic populations (Clopton, 1978). However, they do seem somewhat different from the inpatient female populations reported by Zelan, Fox, Gould, and Olson (1966);

Curlee (1977); and Jansen and Hoffman (1973). The female subjects in the present study scored higher on Pd and Pa, perhaps representing a somewhat greater degree of pathology. They seem to resemble most closely an outpatient clinic sample of female alcoholics reported by Zelan et al. (1966).

The male group scored significantly higher on the Mf scale and significantly lower on Hy, Pd, and Dn than the female group. The Mf scores indicate that the men tend to be more passive, dependent, and sentimental than men in general, while female subjects had a score which was close to that of women in the general population. This is very similar to the findings of Jansen and Hoffman (1973). The higher Pd, Hy, and Dn scores of the female group indicates a greater tendency towards antisocial behavior and denial of problems.

To test the hypothesis that selected scales were related to treatment completion, the male and female groups were first examined to determine if the groups could be combined for analysis of the scales L, K, A, R, Dy, Do, Cn, Ad, and Dn. An analysis which simultaneously tests the intercept and the slope of the regression line yielded a significant difference between the groups when these scales were used to predict treatment completion, $F(9, 210) = 2.46$, $p < .02$ (see Table 2). Consequently, male and female groups were examined separately for this part of the analysis.

A Priori Analyses

Analysis of Male Subjects on Selected MMPI Variables

A simple multiple regression analysis to predict treatment completion was performed using the raw scores of L, K, A, R, Do, Dy, Cn, Ad,

Table 2

Male-Female Comparison on L, K, A, R, Do, Dy, Cn, Ad, and Dn

Source	df	SS	MS	F
SS deviation	9	21.38	2.38	2.46*
SS error	210	202.38	.96	
SS total	219	223.75		

*$p < .02$

and Dn as the predictor variables for treatment completion. The resulting regression equation was significant $F(9, 172) = 2.08$, $p < .05$, accounting for 9.8% of the variance (see Table 3).

Table 3

Multiple Regression (Males): Treatment Completion X

L, K, A, R, Do, Dy, Cn, Ad, Dn

Multiple R	R Square	Source	df	SS	MS	F
.313	.098	Regression	9	17.12	1.90	2.08*
		Residual	172	156.95		

*$p < .05$

Two of the variables emerged as significant predictors of treatment completion: Conscious Repression (R), $F(1, 172) = 5.92$, $p < .02$ and Dependency (Dy), $F(1, 172) = 4.19$, $p < .05$. Males who completed treatment scored higher on the Dy scale and lower on the R scale. Completers can be characterized as more willing to admit strong dependency

needs, lacking in self-confidence, and less likely to use conscious denial and rationalization as coping behaviors (Graham, 1977). Both scales were significant in the predicted direction.

The Dy score as a predictor of treatment completion is consistent with the findings of Mozdzierz et al. (1973) who reported that male veterans who left treatment AMA scored lower on the Dy scale. This finding also seems consistent with reports by Blane and Meyers (1963) and Tarnower and Toole (1968) that overtly dependent alcoholics were more likely to remain in treatment, while the counterdependent alcoholic (who avoids any expression of dependent behavior, although basically quite dependent) is more likely to leave a treatment program.

The lower R scores of the subjects who completed treatment indicates that there is less conscious suppression of information (Duckworth & Duckworth, 1975) or, perhaps a tendency to acknowledge psychopathology (Edwards & Abbott, 1972). McWilliams and Brown (1977), the only other investigators who have examined the R scale in the context of treatment completion, failed to find a relationship.

To gain a different perspective of the predictor variables, a discriminant function analysis was performed for the male group. Subjects were classified into one of four discharge types: (1) approved discharges, (2) subjects dismissed from treatment, (3) subjects who left against staff advice, and (4) subjects who went AWOL.

Table 4 presents the canonical discriminant functions for the male group. The first two functions account for the major portion of the variance that can be predicted with these variables. A third function was computed but not used because of its low discriminatory power.

Table 4

Canonical Discriminant Functions (Males)

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.1314	.3408	.7867	41.8	27	.034
2	.1040	.3070	.8901	20.3	16	.207

An examination of the group centroids (see Table 5) indicates that function 1 differentiates AWOL patients from other groups, while function 2 differentiates those who leave ASA from other groups.

Table 5

Group Centroids (Males)

Discharge Type	Function 1	Function 2
Approved	.08309	- .08785
Dismissed	- .33748	.11492
ASA	- .13328	1.09339
AWOL	-2.08323	- .31917

Figure 1 is a graphic presentation of the group centroids on functions 1 and 2. The AWOL and ASA groups are more clearly distinguishable, while the approved and dismissed groups seem to occupy a common space.

Table 6 presents the loadings of the selected variables on the canonical functions. The first canonical function has its highest correlation with Control (Cn) and Dependency (Dy). An examination of the

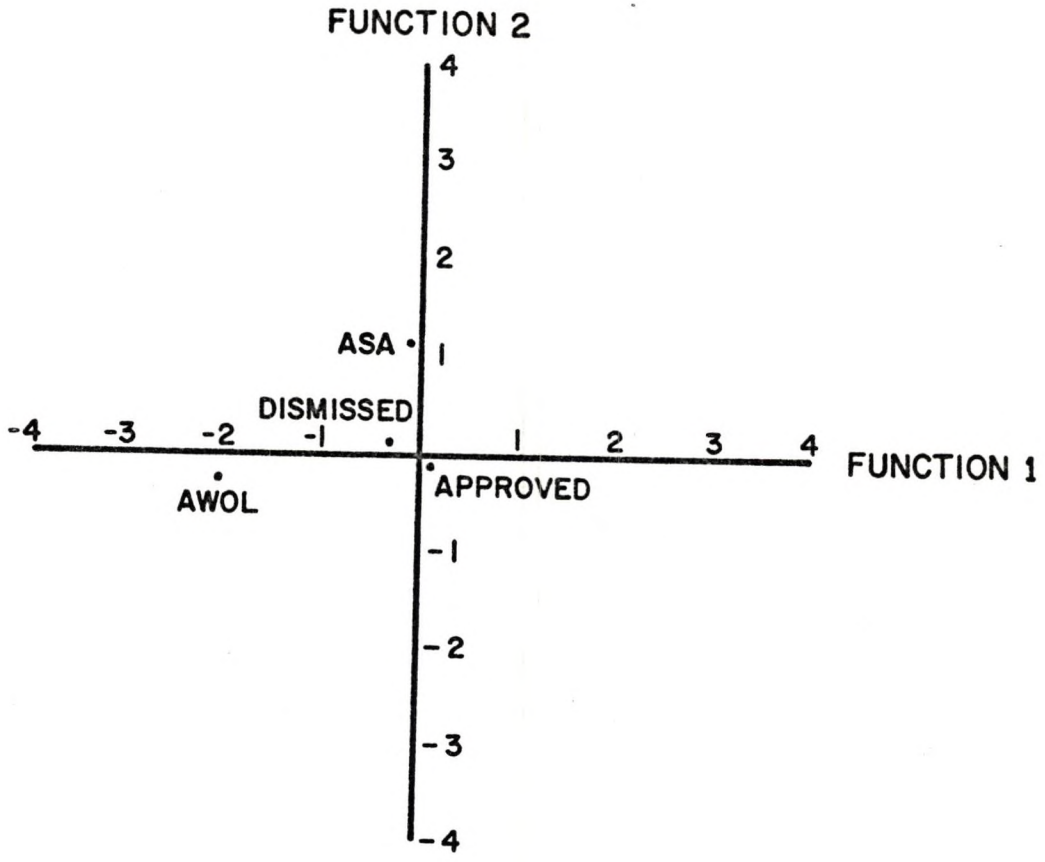

Figure 1

PLOT OF MALE GROUP CENTROIDS

Table 6

Loadings on Canonical Functions (Males)

Variable	Function 1	Function 2
L	-.284	-.099
K	.097	-.230
A	.112	-.041
R	-.064	-.811
Dy	.320	.040
Do	.155	.219
Cn	.607	-.032
Ad	.086	-.345
Dn	.017	-.169

group means shows that the AWOL group scored lower on these scales than other groups.

The second canonical function, which seems to differentiate those who left ASA from other groups has its highest correlations with the Conscious Repression (R) scale and the Admission (Ad) scale. An examination of the group means shows that the ASA group scored higher on R and Ad than other groups.

The canonical discriminant analysis of the male group permitted a breakdown of the "non-completers" (from the regression analysis) into two distinguishable groups, AWOL and ASA patients. It also permits some inference about Dy and R as predictors of treatment completion. The AWOL group scored lower on Dy and Cn, indicating that they were less likely to admit to dependency needs and more likely to exhibit problem behaviors than other groups. The ASA group scored higher on R and Ad, indicating the use of conscious denial and rationalization as coping behaviors, while admitting to physiological symptoms.

The lower Cn scores of the males who went AWOL contrast sharply with the finding of Wilkinson et al. (1971) who reported that the Cn score was negatively correlated with length of stay in a 90 day VA treatment program. This discrepancy may arise from differences in treatment programs, in populations being studied, or from random fluctuations associated with small sample sizes.

The R score has not previously been reported as a predictor of treatment completion. Only McWilliams and Brown (1977) have used this scale and they found that the R scale failed to discriminate between completers and non-completers in a state hospital program. However, in the present study high R scores were characteristic of males who failed to complete treatment (multiple regression analysis) and more specifically identified patients who left ASA in the discriminant analysis.

Males who left ASA also scored higher on Ad than other groups. This finding seems to be in the opposite direction than reported by Mozdzierz et al. (1973). The discrepancy may be due to differences in treatment programs, populations, or random fluctuations associated with small sample sizes.

Table 7 presents the redundancy indices for the canonical functions of Table 6. The redundancy index appears to be the best expression of the degrees of relationship between variable sets as displayed by the canonical model (Cooley & Lohnes, 1971).

Table 8 presents the corresponding redundancy indices for type of discharge. The indices are low, indicating that although the function for prediction is statistically significant, the amount of variance accounted for is quite low (6.4%).

Table 7

Redundancy Indices for Predictor Variables (Males)

Canonical Function	Redundancy Index
1	.00785
2	.00963

Table 8

Redundancy Indices for Type of Discharge (Males)

Canonical Function	Redundancy Index
1	.01614
2	.04815

Table 9 presents the classification results of the discriminant analysis for the male subjects on the selected variables. Without prior information about group sizes, the function correctly classified 49% of the subjects using the variables L, K, A, R, Dy, Do, Cn, Ad and Dn.

In summary, males who completed treatment scored higher on Dy and lower on R than those who did not. Males who went AWOL could be distinguished by lower Dy and Cn scores, while those who left ASA scored higher on R and Ad.

Table 9

Classification Results (Males)

Discharge Type	N of Cases	Predicted Group Membership 1	2	3	4
1 Approved	160	80	38	27	5
2 Dismissed	3	2	1	0	0
3 ASA	14	4	3	6	1
4 AWOL	5	1	1	0	3

Analysis of Female Subjects on Selected MMPI Variables

First, a simple multiple regression analysis to predict treatment completion was performed. The raw scores of the MMPI scales A, R, Do, Dy, Cn, Ad, and Dn were used as the predictor variables. The resulting regression equation was not significant (see Table 10).

Table 10

Multiple Regression (Females): Treatment Completion X L, K, A, R, Do, Dy, Cn, Ad, Dn

Multiple R	R Square	Source	df	SS	MS	F
.493	.243	Regression	9	14.57	1.62	1.35
		Residual	38	45.43	1.19	

Next, a discriminant function analysis was performed to determine if the female subjects could be classified according to type of discharge they received by the selected variables. None of the women

were dismissed from treatment, therefore subjects were classified into three discharge types and only two functions were computed (see Table 11).

Table 11

Canonical Discriminant Functions (Females)

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.5367	.5910	.4940	28.9	18	.049
2	.3173	.4908	.7591	11.3	8	.185

An examination of the group centroids indicates that function 1 differentiates the AWOL females from other groups, while function 2 differentiates those who completed treatment from other groups (see Table 12).

Table 12

Group Centroids (Females)

Discharge Type	Function 1	Function 2
Approved	.04259	.24170
ASA	1.12071	-1.34746
AWOL	-2.43573	- .97696

Figure 2 is a graphic presentation of the group centroids on the two functions from Table 12. There appear to be clear separations among the three groups.

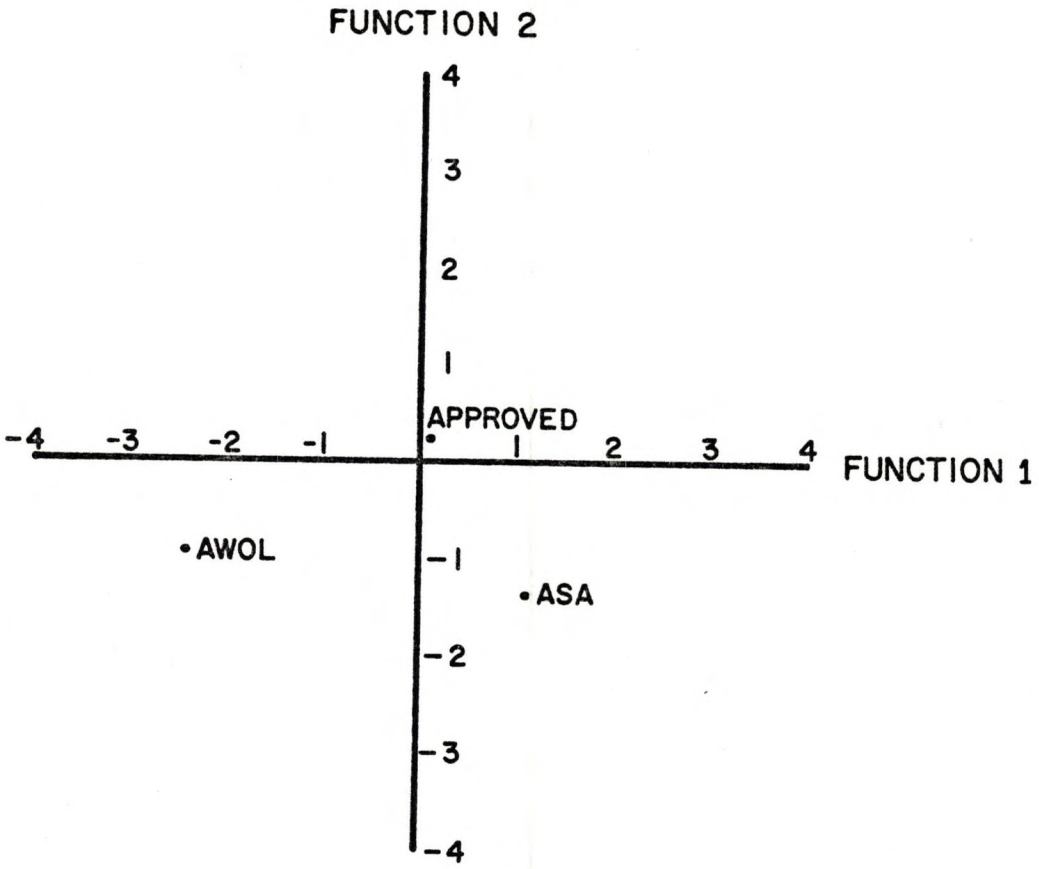

Figure 2

PLOT OF FEMALE GROUP CENTROIDS

Table 13 presents the correlations of the 9 selected variables with the canonical functions for the female group. The first function, which differentiates the AWOL group from other groups, is most highly correlated with Do, Ad, A, and Dy. An examination of the group means indicates that the AWOL group scored lower on the Dominance scale and higher on Admission, Conscious Anxiety, and Dependency than other groups. This group can be characterized as overtly anxious, admitting to physiological symptoms, and feeling unable to take charge of their lives.

It is somewhat puzzling to find individuals with the high Dy - low Do combination in the AWOL group because persons with this profile are often very dependent on their therapist (Duckworth & Duckworth, 1975). Perhaps women in this group are very dependent on some significant person and entry into a treatment program isolates them from this relationship.

The second canonical function has its highest correlations with Do, R, Dy, and K, indicating the tendency for those who completed treatment to score higher on the Dominance and K scales and lower on the Conscious Repression and Dependency scales than other groups. They seem more independent and capable of dealing with daily problems.

The results of the analyses with female groups are difficult to compare with previous studies because of the scarcity of information about chemically dependent women in the literature and the complete absence of studies which examine the relationship between these MMPI scales and treatment completion with women. The females in this study do not appear to be similar to male populations studied by Mozdzierz et al. (1973), Krasnoff (1976, 1977), or Wilkinson et al. (1971). They

Table 13

Loadings on Canonical Functions (Females)

Variable	Function 1	Function 2
L	.272	-.014
K	.074	.350
A	-.398	-.179
R	-.246	-.406
Dy	-.353	-.350
Do	.576	.581
Cn	.068	-.094
Ad	-.430	-.163
Dn	.142	.323

do share one similarity with a population of male alcoholics reported by Hoffman and Jansen (1973). In both groups subjects who completed treatment scored higher on the K scale than an AWOL group.

These females are similar to the males in the present study in that low R scores are characteristic of the subjects who complete treatment. Therefore, it seems that lower levels of denial and rationalization and more openness in sharing information are good prognostic indicators for completing treatment in this program.

The women are strikingly different from the men with regard to scores on the Dy scale. In the male group, AWOL patients were characterized by low Dy scores, whereas women who went AWOL scored higher on Dy.

Table 14 presents the redundancy indices for the canonical functions of Table 13. The proportion of the variables used for prediction is small (6.2%).

Table 15 presents the corresponding redundancy indices for type of discharge. About 25% of the variance in discharge type is accounted

Table 14

Redundancy Indices for Predictor Variables (Females)

Canonical Function	Redundancy Index
1	.03746
2	.02460

Table 15

Redundancy Indices for Type of Discharge (Females)

Canonical Function	Redundancy Index
1	.05384
2	.20375

for by the nine variables, a much greater proportion than the corresponding index for the male group.

Table 16 presents the classification results of the discriminant analysis for the female group. Seventy-nine percent of the female group was correctly classified. All members of the AWOL and ASA groups were correctly identified by the analysis.

In summary, females who completed treatment scored higher on Do and K and lower on R and Dy than other groups. Females who went AWOL could be distinguished by lower scores on Do and higher scores on Ad, A, and Dy.

Table 16

Classification Results (Females)

Discharge Type	N of Cases	Predicted Group Membership 1	3	4
1 Approved	40	30	7	3
3 ASA	5	0	5	0
4 AWOL	3	0	0	3

Post Hoc Analyses

Prediction of Treatment Completion Using Sociocultural and MMPI Variables

Post hoc data analyses were carried out to determine if treatment completion was related to certain sociocultural variables, to the standard MMPI scales, or to the selected scales when examined in the context of sociocultural variables and the standard MMPI scales.

The sociocultural variables included were age, religion, counselor assigned during treatment, type of admission, race, employment status, marital status, and type of chemical used. The MMPI variables in this analysis (converted to non K-corrected T scores) were L, F, K, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma, Si, A, R, Dy, Do, Cn, Ad, Dn, and Am. An analysis to simultaneously test the intercept and slope of the regression line for these variables yielded no significant difference between the male and female groups. Therefore the groups were combined for the remaining analyses.

The 230 subjects were randomly divided into two groups to provide a replication group for this phase of the analysis. This resulted in samples of 123 and 107 subjects for groups 1 and 2 respectively. A stepwise multiple regression analysis was performed on the data from group 1. At each step, the variable that makes the greatest increment to R^2 is entered into the equation. Three variables were significant at the point they entered the regression equation: Social Introversion (Si), $F(1, 121) = 6.24$, $p < .02$; Admission type, $F(1, 120) = 5.18$, $p < .03$ and the Holmes Alcoholism scale (Am), $F(1, 119) = 6.41$, $p < .02$. The equation with these variables was significant and accounted for 13.5% of the variance (see Table 17). Subjects who completed treatment in this group were more likely to have entered treatment in lieu of committment or a jail sentence, and scored lower on the Si scale and higher on the Am scale than those who dropped out.

A stepwise multiple regression of group 2 also yielded three significant variables: type of chemical used, $F(1, 105) = 9.17$, $p < .01$; Psychasthenia (Pt), $F(1, 100) = 5.21$, $p < .03$; and Conscious Anxiety (A), $F(1, 99) = 4.13$, $p < .03$. Table 18 presents the data from this equation. Treatment completion was associated with alcohol use, lower scores on Pt and higher scores on the A scale.

Thus, the attempt to replicate the stepwise regression analysis of group 1 failed, and identified other variables as significant instead. This failure may be due to the unreliability of regression weights when a large number of predictor variables are used (Kerlinger & Pedhazur, 1973). This is a particularly serious problem with the stepwise procedure if intercorrelations between the variables are high and they tend

Table 17

Stepwise Multiple Regression Group 1: Treatment Completion X Si, Admission Type, Am

Multiple R	R Square	Source	df	SS	MS	F
.367	.135	Regression	3	17.80	5.93	6.19*
		Residual	119	114.05	.96	

*$p < .001$

Table 18

Stepwise Multiple Regression Group 2: Treatment Completion X Chemical, Pt, A

Multiple R	R Square	Source	df	SS	MS	F
.350	.123	Regression	3	12.63	4.21	4.81*
		Residual	103	90.16	.88	

*$p < .01$

to measure the same thing. For example Si, which was a significant predictor in the regression analysis for group 1, correlated .60 with Pt and .61 with A which were predictors in the regression analysis for group 2.

In order to help clarify the inconsistent results of the regression analysis, a stepwise discriminant analysis was performed on the data from the entire sample. In stepwise discriminant analysis variables are selected for entry into the analysis on the basis of their

discriminating power. The type of stepwise analysis used was Rao's V, a generalized distance measure. The variable selected at each step is the one which contributes the largest increase in V when added to the previous variables. This results in the greatest overall separation of the groups (Klecka, 1975).

Fourteen of the original 35 variables were selected before the addition to Rao's V became nonsignificant. This resulted in two significant functions and a third function which approached significance (see Table 19).

An examination of the group centroids (see Table 20) indicates that the first function seems to distinguish those who were dismissed from treatment from other groups. The second function distinguishes AWOL patients from other groups, and the third function differentiates those who left treatment ASA.

Figure 3 is a graphic presentation of the group centroids on the first two functions. A three dimensional presentation which included all three functions would illustrate more clearly the separation between those who completed treatment and the ASA group.

Table 21 presents the correlations of the 14 variables from the stepwise discriminant analysis on the canonical functions. The first function, which identifies subjects who were dismissed from treatment, has its highest correlations with the variables of marital status, type of chemical used, religious orientation, and the Paranoia scale of the MMPI. All subjects in this group were single Catholic men who scored high on the Paranoia scale and tended to identify their problems as a difficulty with drugs rather than alcohol.

Table 19

Canonical Discriminant Functions (All Subjects)

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.18553	.3956	.6604	91.3	42	.0001
2	.16640	.3778	.7829	53.8	26	.0011
3	.09505	.2946	.9132	20.0	12	.0675

Table 20

Group Centroids (All Subjects)

Discharge Type	Function 1	Function 2	Function 3
Approved	.05280	.11189	.07369
Dismissed	-3.70940	.16704	- .05065
ASA	.05756	- .35369	- .98188
AWOL	- .06584	-2.01998	.50879

Table 21

Loadings on Canonical Functions (All Subjects)

Variable	Function 1	Function 2	Function 3
Marital Status	.531	-.065	-.220
Religion 1	.425	.075	.090
Chemical	.508	.061	-.185
Cn	.095	-.405	.122
Pd	-.216	.310	-.015
Si	-.055	.432	.069
Religion 2	-.040	-.193	.274
Pa	-.448	.149	-.112
Ma	-.077	-.070	-.283
Race	-.056	-.025	-.448
Admission Type 2	.257	.226	.224
Admission Type 1	.042	.317	.131
Am	-.074	-.251	-.086
Hy	-.006	.068	.245

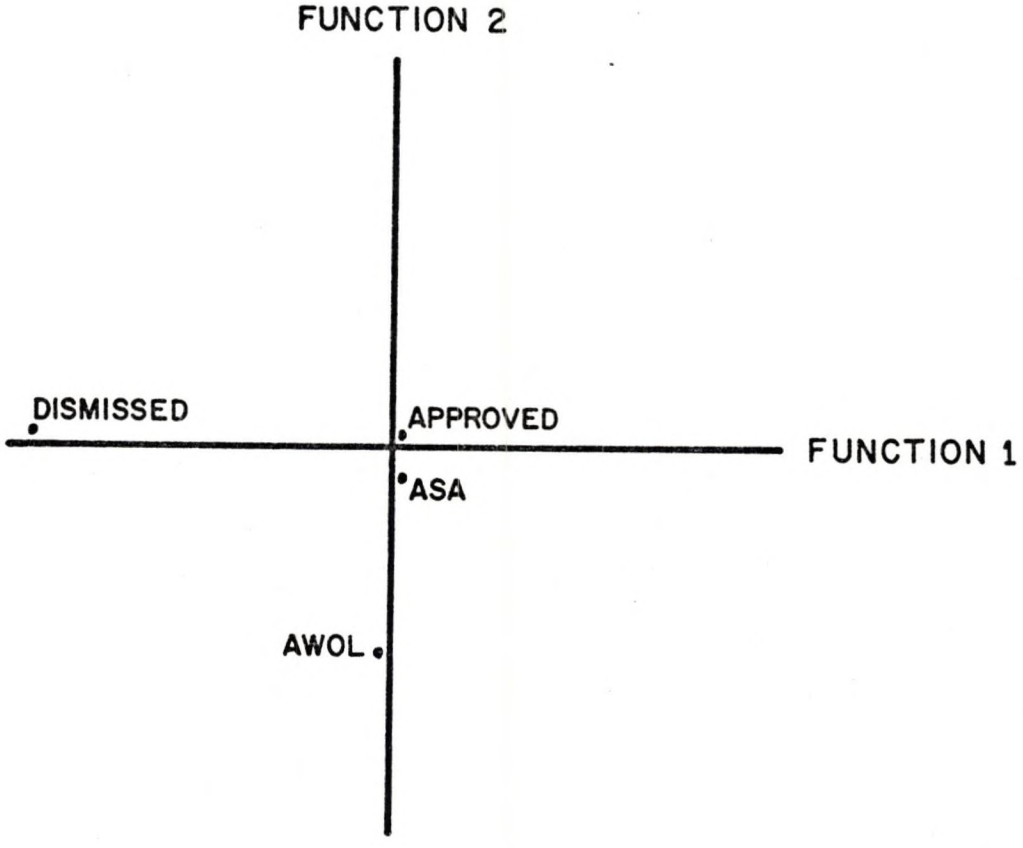

Figure 3

PLOT OF GROUP CENTROIDS FOR ALL SUBJECTS

The second canonical function, which differentiates AWOL patients from other groups, has its highest loadings on the Social Introversion (Si) and Control (Cn) scales. This group seems to be composed of more socially isolated individuals with a greater tendency to show the behavior indicated by their clinical scale elevations.

The third canonical function primarily distinguishes patients who left ASA and is most highly correlated with the variable of race. Members of this group were more likely to be non-caucasian.

The AWOL patients in the combined sample of men and women seem to share some common features with a group of treatment drop-outs described by Miller et al. (1968) in that both groups were more socially detached and less emotionally controlled. Otherwise the results of the discriminant function do not seem to parallel results of previous studies.

Table 22 presents the redundancy indices for the canonical functions of Table 21. Only a very small proportion of the variance (2%) in those 14 variables is used to generate the prediction.

Table 23 presents the corresponding indices for type of discharge. The 14 variables account for about 12% of the variance in type of discharge.

One interesting aspect of the stepwise discriminant analysis concerns the role of the selected MMPI scales examined earlier in this study. When examined in the context of sociocultural variables and the clinical scales of the MMPI, they do not seem to be of much value in predicting type of discharge. Only one of the scales, Cn, appeared to be of much importance in this context.

Table 22

Redundancy Indices for Predictor Variables (All Subjects)

Canonical Function	Redundancy Index
1	.01190
2	.00759
3	.00382

Table 23

Redundancy Indices for Type of Discharge (All Subjects)

Canonical Function	Redundancy Index
1	.05743
2	.02765
3	.03812

In summary, the attempt to replicate the stepwise multiple regression with combined male and female groups on all MMPI and sociocultural variables was not successful. The stepwise discriminant analysis indicated that patients dismissed from treatment were all single, Catholic males who had higher Pa scores and tended to use drugs, while the AWOL group had higher Si and lower Cn scores. The most clearly distinguishing feature of the ASA group was that they tended to be non-Caucasian. Although two of the functions were highly significant and the third function approached significance, the redundancy index indicated that only a relatively small portion (12%) of the variance was accounted for.

Differences from Previous Studies

In examining the relationship between the MMPI and treatment completion, the present study failed to obtain results that are concordant with previous reports. There are a number of possible reasons for this, including population and sampling differences, differences in the type of program, and factors associated with different statistical techniques.

There are obvious differences in the populations that have been studied. The patients studied by Mozdzierz et al. (1973) and Wilkinson et al. (1971) were veterans; those studied by Krasnoff (1976, 1977), McWilliams and Brown (1977), and Hoffman and Jansen (1973) were in state hospitals; while the subjects in the current study were from a privately operated treatment program.

Another difference in the populations may have been the type of patient. Those studied by Wilkinson et al. (1971) and Mozdzierz et al. (1973) were all voluntary, while the samples studied by Hoffman and Jansen (1973), Huber and Danahy (1975), Krasnoff (1976, 1977) and McWilliams and Brown included committed as well as voluntary patients. The present study included voluntary patients, committed patients, and patients who had volunteered for treatment in lieu of committment or a jail sentence.

A further difference may have been in the classification or sampling of patients in previous studies. Krasnoff (1976, 1977), Wilkinson et al. (1971) and Huber and Danahy (1975) classified patients as completers or non-completers, while Mozdzierz et al. (1973) compared an AMA group with a non-AMA group. McWilliams and Brown compared three groups

of patients: problem free discharges, provisional discharges, and non-completers, while Hoffman and Jansen examined five groups: provisional discharges, unauthorized absence, with medical advice, against medical advice, and AWOL.

Differences in the length of the program may also have been a factor. The program described by Wilkinson et al. (1971) was 90 days and those described by Krasnoff (1976, 1977), Mozdzierz et al. (1973), and McWilliams and Brown were 6 to 8 weeks in length, while the program in the current study did not have a specified length. Instead, completion was more closely tied to satisfactory progress (as judged by the counselor) and the time required for completion ranged from 24 to 60 days, with a mean of 36 days and a standard deviation of 5.8 days. Consequently, some patients who dropped out of other, longer programs might have completed treatment in this program.

It is also possible that some of the results reported are due to statistical artifacts. Hoffman and Jansen (1973) made 65 comparisons and found that 11 were significant. They acknowledged that some were significant due to chance. Wilkinson et al. (1971) reported that, of 24 measures from the MMPI, the Cn scale was the only one significantly correlated with treatment completion. In addition, the two studies which found that K was a predictor (Hoffman & Jansen, 1973; Mozdzierz et al., 1973) reported conflicting results.

Another factor that must be considered is the type of statistical techniques used to analyze data. Very few other studies have used multivariate techniques, therefore their findings seldom consider profile differences in predicting treatment completion (Clopton, 1978).

English and Curtain (1975) found many differences in the MMPI scores of alcoholics at three different treatment programs, even though the program participants were recruited from the same geographic area. Therefore it is not surprising that the subjects in the present study, from a private treatment program differ from subjects who were in VA or state hospital programs. Perhaps it is wiser, as English and Curtain (1974) suggest, to develop local norms for instruments used in evaluation and prediction of treatment outcome variables rather than search for a single constellation of variables that will predict treatment completion for all programs.

CONCLUSIONS

Summary

Patients who completed treatment scored lower on the Conscious Repression and Social Introversion scales and higher on the Control scale. Male completers also had higher Dependency scores, while female completers scored lower on the Dependency scale than those who did not complete treatment. Thus, males who complete treatment can be characterized as more socially extroverted and more willing to admit strong dependency needs. They are less likely to use conscious denial and rationalization as coping behaviors, and less likely to exhibit problem behaviors indicated by clinical score elevations. Women who complete treatment are similar to the men except that they seem less likely to admit strong dependency needs.

The results show that the selected special scales of the MMPI examined in this study are of some value in predicting completion of treatment in this particular chemical dependency program. However, their value is of limited usefulness because only a small proportion of the variance could be accounted for.

Directions for Future Research

There are a number of possible avenues for future research. First there is a need for increased use of multivariate techniques in

order to determine if MMPI profile differences are related to treatment completion (Clopton, 1978). To date, most studies have limited themselves to an examination of differences between the means of completers and non-completers without considering differences in profile patterns.

It also appears that more precise distinction of subgroups of non-completers would be useful. The results of the present study indicate that ASA and AWOL groups have different characteristics and that combining them into a single non-completers group obscures some of these distinctions.

Further research needs to be undertaken with female alcoholics. The total absence of studies which have used special scales of the MMPI clearly indicates a need for more research in this area.

There is a general need for more research that examines the relationship between personality test scores and treatment outcome. It might be fruitful to examine the interaction between the personality types of patient and counselor in chemical dependency treatment programs. It may also be useful to determine if particular treatment programs are most beneficial to particular alcoholic personalities.

Finally, it may be useful to investigate whether or not certain alcoholic personality types are most likely to benefit from treatment, a question which will be examined in Part II of this study.

PART II. TREATMENT OUTCOME

METHOD

Design

The purpose of Part II was to investigate the usefulness of MMPI scales in predicting treatment outcome. Treatment outcome was examined for three different groups, and information was obtained at 1, 6, or 12 months following completion of treatment for the respective groups. Both a priori and post hoc analyses were performed to examine the data.

First, a priori analyses using multiple regression were performed. Self-reports and collateral informant reports of chemical use were the criterion variables. The predictor variables for the a priori analyses were Pd, Ma, Amac, A, R, Dy, Do, Cn, Ad, Dn, and Am. The scales of Pd, Ma, and Amac were selected because some previous research has indicated that they are related to outcome in chemical dependency treatment. The scales of A, R, Dy, Do, Cn, Ad, Dn, and Am were chosen because their utility as predictors of treatment outcome has not been explored.

Post hoc analyses using canonical correlation were also performed. The criterion variables used were self-reports of chemical use, employment status, admissions for detoxification, and collateral informant reports of chemical use. The predictor variables for the post hoc analyses were sociocultural and MMPI variables. Stepwise multiple regression was used to select specific predictor variables for use in each canonical correlation.

Subjects

The subjects were 133 individuals who completed the adult inpatient program the months of March, April, May, June, October, November, and December of 1978 and March, April, and May 1979.

The sample contained 107 males whose mean age was 39.2 years with a standard deviation of 13.3 years. Sixty-five percent were Protestant, 31% Catholic, and 4% of other religious beliefs. Ninety-seven percent were Caucasian and 3% were American Indian or Mexican-American. Fifty-six percent were married, 23% were single, 12% were divorced, 7% were separated, and 2% were widowers. Forty-eight percent were voluntary admissions, 44% entered voluntarily in lieu of committment proceedings or a jail sentence, and 8% were committed for treatment involuntarily.

The female group consisted of 26 members whose mean age was 37.5 with a standard deviation of 12.0 years. Sixty-five percent were Protestant, 27% were Catholic, and 7% had other religious beliefs. Fifty percent were married, 23% were single, 19% were divorced, and 8% were widows. All were Caucasian. Eighty-one percent were voluntary admissions, 15% entered voluntarily in lieu of committment or jail and 4% were involuntarily committed.

Procedure

Reports

Individual. Questionnaires concerning alcohol use, drug use, and attendance at Alcoholics Anonymous meetings were mailed to patients 1, 6, or 12 months following completion of treatment (see Appendix A).

This initial mailing was part of the regular evaluation program at the treatment center. If no response was received, follow-up questionnaires and/or telephone calls by the investigator were used to contact the individual.

Informant. At the time each individual entered treatment, he or she was asked to designate a person who could be contacted for evaluation information (the collateral informant). A questionnaire concerning alcohol and drug use, employment, and AA attendance (see Appendix B) was sent to this collateral informant 1, 6, or 12 months following completion of treatment for individuals in the respective groups. If no response was received, follow-up questionnaires and/or telephone calls were used to contact the collateral informant.

Individuals who entered a chemical dependency treatment program during the follow-up period were considered treatment failures for the purposes of this study. On outcome measures concerning chemical use they were considered not-improved or non-abstinent.

The state detoxification center for a seven county area is also located at this facility. The data concerning readmissions for detoxification was obtained by screening records available there. An admission for detoxification was counted only if it occurred during the follow-up period. For example, in the 12 month group, all admissions for 1 year following completion of treatment were counted. In the 1 month group only admissions for detoxification which occurred in the month immediately following treatment completion were counted.

RESULTS AND DISCUSSION

A Priori Analyses

Twelve Month Follow-up (Males)

This group consisted of 47 males who completed treatment between March 2nd and June 22nd 1978. One subject was deceased at the time of follow-up, leaving 46 subjects for whom data was potentially available. Responses were received from 36 (78%) of the collateral informants for the 12 month group. One informant was deceased and 4 had moved without leaving a forwarding address. Five other informants did not respond to mailed questionnaires and could not be contacted by telephone.

Information for the individual questionnaire was obtained for 28 (61%) of the subjects. Eight others had moved and left no forwarding address, one subject declined to participate, and nine subjects did not respond to mailed questionnaires and could not be contacted by telephone.

First, a simple multiple regression analysis was performed with the informant's assessment of the subject's chemical usage as the criterion variable and Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, and Amac as the predictor variables. Subjects were divided into two groups, improved and not improved. The resulting regression equation was significant, accounting for 54% of the variance (see Table 24). Three variables were significant predictors of improvement, Conscious Repression (R), $F(1, 24) = 6.53$, $p < .02$; Admission (Ad), $F(1, 24) = 6.55$, $p < .02$; and the Holmes alcoholism scale (Am), $F(1, 24) = 6.62$, $p < .02$. Am was

Table 24

Multiple Regression 12 Month Group (Informant Report): Chemical Use X Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, Amac

Multiple R	R Square	Source	df	SS	MS	F
.736	.52456	Regression	11	18.02	1.64	2.59*
		Residual	24	15.20	.63	

*$p < .03$

positively correlated with improvement, while R and Ad were negatively correlated with improvement, as reported by the collateral informant 12 months after treatment completion. Subjects who were rated as improved were less likely to use conscious denial and rationalization as coping behaviors. They were less likely to complain about somatic symptoms and they scored higher on the Holmes Alcoholism scale.

Next, a simple multiple regression analysis was performed for the data from the individual questionnaire, using the same 11 selected variables. The regression equation was significant, accounting for 67% of the variance (see Table 25). Only one variable was significant, the Hypomania scale (Ma), $F(1, 16) = 5.76$, $p < .03$. Ma scores were negatively correlated with improvement.

Subjects were then classified as abstainers or non-abstainers. According to informant reports 16 (44%) of the subjects were abstinent 1 year following treatment completion. (If the ten subjects for whom informant reports were not available are arbitrarily classified non-abstinent, the overall rate of abstinence was 35%.) In either case,

Table 25

Multiple Regression 12 Month Group (Self-Report): Chemical Use X Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, Amac

Multiple R	R Square	Source	df	SS	MS	F
.820	.672	Regression	11	12.68	1.15	2.98*
		Residual	16	6.18	.39	

*$p < .03$

this abstinence rate is within the normal range reported in treatment outcome studies (Emrick, 1974).

According to individual reports 50% were abstinent at the 12 month follow-up. When missing cases were classified as non-abstinent, this rate fell to 30%.

Multiple regression analyses were then performed for the data from both informants and individuals. Neither analysis was significant, indicating the inability of these variables to discriminate abstainers from non-abstainers one year following treatment completion.

In summary, using information from the collateral informant, improved patients could be distinguished by higher Am scores, and lower scores on R and Ad. When the self reports were used, improved patients could be distinguished by lower Ma scores. Abstainers could not be distinguished from non-abstainers.

As a measure of treatment outcome, the Admission scale requires a more in-depth analysis. The Ad scale consists largely of symptoms which the subject acknowledges that he has. Little and Fisher (1958)

report that high scorers are in general psychological distress and complain about somatic functions. An examination of the content of the Ad scale shows that some items may be indicators of chronicity in alcoholics. The scale contains items concerning dizzy spells, fainting spells, headaches, balance, shaking of the hand, and other bodily complaints which may be associated with prolonged heavy drinking. Perhaps lower Ad scores are associated with improvement because these subjects are at a less advanced stage of alcoholism.

High scores on the Am scale were also associated with improvement. Finney et al. (1971) describes high scorers as rather unpredictable people, puritanical in some ways but not at all in others, trusting others and often disappointed, jealous and sensitive.

Improvement, as measured by the individual report was associated with lower Ma scores. Pokorny et al. (1968) found that lower Ma scores were an indicator of abstinence for a selected group 1 year following treatment, but were not a predictor of improvement when all subjects were included in the analysis. One similarity between the two studies is that lower Ma scores are associated with some reduction in drinking, as reported by the individual, 1 year after treatment completion.

Six Month Follow-up (Males)

The 6 month outcome group consisted of the 25 males who completed treatment in October, November, and December, 1978. Responses were received from 23 (92%) of the collateral informants for this group. One informant had moved leaving no forwarding address, one did not respond to the questionnaire and could not be contacted by telephone,

and one collateral informant who responded could provide no information concerning the subject. This left 22 responses from informants with some useable information.

Information for the individual questionnaire was obtained from 15 subjects. Five subjects had moved, and five others did not respond to mailed questionnaires and could not be contacted by telephone. This resulted in a 60% return rate for individual questionnaires in the 6 month group.

Subjects were classified as improved or not improved according to their reported use of alcohol and drugs, and multiple regression analyses were performed using the MMPI variables Pd, Ma, A, R, Do, Dy, Cn, Ad, Dn, Am, and Amac. The results were not significant for either the collateral informant report or the individual's report.

Next, subjects were again classified as abstinent or non-abstinent. According to the informant's report, 11 subjects (50%) were abstinent. Eight individuals (53% of those for whom data was available) reported that they were abstinent. Multiple regression analyses for both individual and informant reports were unable to identify abstainers.

In summary, at a 6 month follow-up, improved patients could not be distinguished from those who had not improved, and abstainers could not be distinguished from non-abstainers. This was true for reports of chemical use by both the individual and the collateral informant.

One Month Follow-up (Males)

The 1 month follow-up group consisted of 37 males who completed treatment between March 1 and May 29, 1979. Responses were received from 36 (97%) of the collateral informants. One informant declined to participate. Individual responses were received from 23 (62%) of the subjects. One subject declined to participate and 13 others did not respond to mailed questionnaires and could not be contacted by telephone.

All informants and all individuals reported improvement at the one month follow-up point. Therefore, subjects were classified as abstainers or non-abstainers. Informants reported an 89% abstinence rate, and individuals an abstinence rate of 87%. Multiple regression analyses were then performed using Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, and Amac as predictor variables. The results for both self reports and collateral informant reports were not significant.

In summary, one month following completion of treatment all subjects and informants reported improvement. Abstainers could not be distinguished from non-abstainers in a multiple regression analysis.

Analysis of Combined 1, 6, and 12 Month Groups

In order to examine the selected MMPI variables in a different context the three groups were combined. One-way analyses of variance were performed to compare the groups on age, race, religion, and marital status. The groups were significantly different on the variable of age, $F(2, 104) = 3.86$, $p < .03$. The 6 month group had a mean age of 33, while the ages of members of the 1 and 12 month groups were 40 and 42

respectively. The Tukey-B procedure showed that the means of the 6 month and 12 month groups were significantly different.

When those subjects who had responded to the individual questionnaire were examined, the analysis of variance indicated that there was a significant difference in religious preference among the groups, $F(2, 63) = 3.32$, $p < .05$.

In view of these group differences, and previous reports (Armor et al., 1978) that age and religious preference are related to abstinence and problem drinking, results with the combined groups must be viewed with caution.

A multiple regression analysis for the combined groups was performed using Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, Amac, and number of months since completion of treatment as the predictor variables. Subjects were classified as improved or not improved according to the collateral informant's report. The resulting regression was significant, accounting for 34% of the variance (see Table 26). Two variables were significant predictors of improvement: number of months since completion of treatment, $F(1, 81) = 10.98$, $p < .002$; and the Admission scale (Ad), $F(1, 81) = 6.83$, $p < .01$. Improvement was associated with lower Ad scores and recent completion of treatment.

Next, a multiple regression analysis was performed using the individual report to classify subjects as improved or not improved and the same predictor variables. The regression equation was significant, $F(12, 53) = 2.14$, $p < .03$ (see Table 27). The Admission scale and the number of months since treatment completion were both significant predictors, $F(1, 81) = 4.94$, $p < .05$ and $F(1, 81) = 4.93$, $p < .05$

Table 26

Multiple Regression Combined Groups (Informant Report): Chemical Use X Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, Amac, Time

Multiple R	R Square	Source	df	SS	MS	F
.580	.337	Regression	12	17.89	1.49	3.43*
		Residual	81	35.21	.43	

*p < .0005

Table 27

Multiple Regression Combined Groups (Informant Report): Abstinence X Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, Amac, Time

Multiple R	R Square	Source	df	SS	MS	F
.549	.302	Regression	12	59.63	4.97	2.92*
		Residual	81	138.08	1.70	

*p < .003

respectively. Improvement was associated with lower Ad scores and recent treatment completion.

When subjects in the combined group were classified as abstainers or non-abstainers according to the informant's report, the multiple regression analysis using the selected variables was significant (see Table 27). One variable, the number of months since completion of treatment was related to abstinence, $F(1, 81) = 8.21$, $p < .01$. Abstainers were more likely to have completed treatment recently.

Next, the individual report was used to classify subjects as abstainers or non-abstainers. The regression analysis was significant, accounting for 32.8% of the variance (see Table 28). Three variables were significant predictors of abstention: number of months since treatment completion, $F(1, 53) = 8.70$, $p < .01$; the Denial scale (Dn), $F(1, 53) = 5.87$, $p < .02$; and the Admission scale (Ad), $F(1, 53) = 4.04$, $p < .05$. According to information from the individual questionnaire abstinence was associated with lower Ad and Dn scores and recent completion of treatment.

Table 28

Multiple Regression Combined Groups (Self-Report): Abstinence X Pd, Ma, A, R, Dy, Do, Cn, Ad, Dn, Am, Amac, Time

Multiple R	R Square	Source	df	SS	MS	F
.573	.328	Regression	12	45.09	3.76	2.16*
		Residual	53	92.36	1.74	

*$p < .03$

In summary, members of the 1, 6, and 12 month groups were combined for this phase of the analysis. Improvement was associated with lower scores on the Ad scale and recent completion of treatment, while abstinence was associated with lower Ad and Dn scores and recent completion of treatment.

As previously noted, the Admission scale may be a measure of chronicity in alcoholics. Because Ad was a predictor of both improvement and abstinence in this analysis of combined groups and a predictor

of improvement in the 1 year follow-up, this may indicate that it is an important variable in predicting treatment outcome.

The lower Dn score associated with abstinence may be an indicator of better interpersonal relations, less hostility, and less suspiciousness. It is not surprising that length of time since treatment completion is related to chemical use. The rate of relapse among alcoholics is notoriously high.

Analysis of Females Who Completed Treatment

Twenty-six females completed treatment during the period of this study and they were combined into one group for analysis. Twenty-one responses were received from collateral informants and 15 responses were obtained from individuals. Multiple regression analyses with the selected variables were not significant for predicting improvement or abstinence using either the individual or informant report.

Post Hoc Treatment Outcome Analyses

Post hoc analyses were carried out to determine if the special scales were predictive of treatment outcome in the context of selected clinical scales and certain sociocultural variables. The data was analyzed using canonical correlation analyses. The criterion variables used were employment status, number of admissions to the detoxification facility, and reports of chemical use by the informant and/or the subject.

The predictor variables initially included in the analysis were age, race, religion, marital status, number of prior admissions to

treatment, Hy, Pa, Ma, Si, A, R, Dy, Do, Cn, Ad, Dn, Am, Amac, and attendance at AA meetings. Stepwise multiple regression was used to select predictor variables which appeared to be most promising for use in each canonical correlation.

Twelve Month Treatment Outcome

Table 29 presents the results of the canonical correlation with the informant's report, employment status, and admissions to detoxification as criterion variables and Si, Ad, Am, Ma, A, and AA attendance as predictor variables. The first canonical function has its highest correlations with the informant's report of chemical use and admissions for detoxification in the criterion set, and with Social Introversion, AA attendance, and the Holmes alcoholism scale in the predictor set. The second function has its highest correlation with employment status in the criterion set and with the Conscious Anxiety scale, AA attendance, and the Admission scale in the predictor set (see Table 30).

Table 29

Canonical Correlation 12 Month Group (Informant Report)

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.5702	.7551	.2481	36.24	18	.007
2	.4030	.6348	.5772	14.28	10	.160

Table 30

Loadings on Canonical Functions 12 Month Group (Informant Report)

Criterion Set			Predictor Set		
Variable	Function 1	Function 2	Variable	Function 1	Function 2
Chemical Use	.991	-.131	Si	.563	-.341
Detoxification	.472	-.206	Ad	-.329	-.352
Employment	.234	-.948	AA Attend.	.467	.477
			Am	.349	-.122
			Ma	-.241	-.048
			A	.203	-.800

Using the criteria of the informant's report and admissions for detoxification, subjects who were improved tend to be more socially introverted, attend AA meetings more frequently, and scored higher on the Holmes alcoholism scale. When employment status was used as a criterion, improvement was associated with less anxiety at the beginning of treatment, more frequent attendance at AA, and fewer somatic complaints.

Table 31 presents the redundancy indices for the predictor variables and Table 32 presents the corresponding indices for the criterion variables. About 37% of the variance in the criterion variables (measures of adjustment) is accounted for by the predictor variables.

The next analysis was a canonical correlation with subjects for whom individual responses were available. Table 33 presents the results of the canonical correlation using self-reports of chemical use, admissions for detoxification, and employment status as criterion variables. Admission to the detoxification facility was perfectly correlated with

Table 31

Redundancy Indices for Predictor Set of 12 Month Group

(Informant Report)

Canonical Function	Redundancy Index
1	.08208
2	.07556

Table 32

Redundancy Indices for Criterion Set of 12 Month Group

(Informant Report)

Canonical Function	Redundancy Index
1	.23936
2	.12877

Table 33

Canonical Correlation 12 Month Group (Self-Report)

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.70216	.8379	.1637	26.24	12	.010
2	.45038	.6711	.5496	8.68	5	.123

the individual's report of chemical use, therefore only two criterion variables were used. The set of predictor variables were Do, A, Cn, Ma, Pa, and the individual's report of AA attendance.

Table 34 presents the correlations of the variables with the canonical functions. The first function was highly correlated with employment status and the predictor variables of Dominance, Conscious Anxiety, and AA attendance. The second function was highly correlated with admissions for detoxification/self-report of chemical use in the criterion set and with the Hypomania and Paranoia scales in the predictor set.

Table 34

Loadings on Canonical Functions 12 Month Group

(Self-Report)

Criterion Set			Predictor Set		
Variable	Function 1	Function 2	Variable	Function 1	Function 2
Chemical Use/			Do	.704	-.092
Detoxification	.074	.997	AA Attend.	.527	.287
Employment	.945	.328	A	-.621	.093
			Cn	-.119	-.091
			Ma	-.021	-.707
			Pa	.141	.589

Improvement, as measured by employment, was associated with higher scores on Dominance, lower scores on Conscious Anxiety, and more frequent AA attendance. Reduced chemical use and a lower frequency of admission for detoxification were associated with lower scores on the Ma

scale and higher scores on Pa. Table 35 presents the redundancy indices for the predictor variables and Table 36 presents the redundancy indices for the criterion variables. About 56% of the variance in the criterion variables was accounted for by the predictors.

Table 35

Redundancy Indices for Predictor Set of 12 Month Group (Self-Report)

Canonical Function	Redundancy Index
1	.13962
2	.07622

Table 36

Redundancy Indices for Criterion Set of 12 Month Group (Self-Report)

Canonical Function	Redundancy Index
1	.31520
2	.24820

In summary, positive treatment outcome (as measured by employment status, admissions for detoxification, and individual and informant reports of chemical use) was associated with lower scores on Ad, A, and Ma; more frequent AA attendance, and higher scores on the Am, Pa, Si, and Do scales.

These results support the findings of other studies. Attendance at Alcoholics Anonymous is often correlated with positive treatment outcome (Emrick, 1974; Kish & Hermann, 1971). The data from the informant reports showed that 31% of the subjects in the 1 year group attended AA at least once a week. This compares favorably with the 9% rate reported by Tomosovic (1970) and the 10% rate reported by Kish and Hermann (1971). Although all three programs placed heavy emphasis on AA, patients from the program in the present study seem more likely to attend AA meetings on a regular basis after discharge.

As previously mentioned, lower Ma scores were an indicator of abstinence for a select group of alcoholics studied by Pokorny et al. (1968). No previous studies have reported Si as an indicator of treatment outcome, and in this case it may be related to the particular population being studied, or the criterion variables being used.

One previous study (Hedberg, Campbell, Weeks, & Powell, 1975) reported that Pa scores were predictive of treatment success. Using the Mini-Mult form of the MMPI with alcoholics in an outpatient program, they found that higher Pa scores were associated with positive treatment outcome at a 6 month follow-up. No previous studies have used Ad, A, Am, or Do in the prediction of treatment outcome.

Six Month Treatment Outcome

In the analysis for this group, admission to the detoxification facility was not used as a criterion because no subject was admitted for detoxification within six months of treatment completion.

The first canonical analysis used employment status and the informant's report of chemical use as criterion variables and Am, Do, A, and Dn as predictor variables (see Table 37).

Table 37

Canonical Correlation 6 Month Group (Informant Report)

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.54513	.7383	.3364	19.06	8	.015
2	.26041	.5103	.7396	5.28	3	.152

The first function was correlated with both the informant's report of chemical use and employment status in the criterion set and with Am, A, and Dn in the predictor set (see Table 38). The second function was most highly correlated with employment status and the predictor variable Am.

Table 38

Loadings on Canonical Functions for 6 Month Group (Informant Report)

Criterion Set			Predictor Set		
Variable	Function 1	Function 2	Variable	Function 1	Function 2
Chemical Use	.902	-.431	Am	.400	.867
Employment	.480	.877	Do	-.068	.186
			A	.466	-.205
			Dn	.356	.047

The redundancy indices for the predictor set are presented in Table 39 and the corresponding indices for the criterion set are presented in Table 40.

Table 39

Redundancy Indices for Predictor Set of 6 Month Group (Informant Report)

Canonical Function	Redundancy Index
1	.06934
2	.05407

Table 40

Redundancy Indices for Criterion Set of 6 Month Group (Informant Report)

Canonical Function	Redundancy Index
1	.28452
2	.12449

The second canonical analysis (see Table 41) used individual reports and employment status as the criterion variables and Amac, Am, and AA attendance as the predictor variables.

Employment and reduced chemical use were both associated with lower Amac scores and greater attendance at AA meetings. In contrast, Am scores were positively correlated with employment and negatively correlated with self-reports of alcohol use. The correlations of the variables with their respective canonical variates are presented in Table 42.

Table 41

Canonical Correlation 6 Month Group (Self-Report)

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.64949	.8059	.1663	17.94	6	.006
2	.52550	.7249	.4745	7.45	2	.024

Table 42

Loadings on Canonical Functions 6 Month Group (Self-Report)

Criterion Set			Predictor Set		
Variable	Function 1	Function 2	Variable	Function 1	Function 2
Employment	.798	.603	Amac	-.398	-.821
Chemical Use	-.734	.680	Am	.823	.004
			AA Attend.	.144	.671

An examination of the redundancy indices (see Tables 43 and 44) indicates that approximately 60% of the variance in the criterion variables is accounted for by the predictor variables.

In summary, when employment status and informant reports were used as indicators of improvement, subjects who scored higher on Am, A, and Dn were most improved. In contrast, when self-reports of chemical use was the criterion, improvement was associated with AA attendance and lower Amac scores. High scores on the Am scale were associated with being employed, but also with self-reports of greater alcohol use.

Table 43

Redundancy Indices for Predictor Set of 6 Month Group (Self-Report)

Canonical Function	Redundancy Index
1	.18529
2	.19695

Table 44

Redundancy Indices for Criterion Set of 6 Month Group (Self-Report)

Canonical Function	Redundancy Index
1	.38142
2	.21689

The Am score was also a prognostic indicator in the canonical analysis with the 12 month group. This finding seems to indicate a need for more investigation between treatment outcome and the Am scale.

Lower Amac scores as a correlate of improvement in this analysis is consistent with the findings of Gellens et al. (1976). They reported that lower Amac scores were characteristic of patients who drank less in a behaviorally oriented treatment program and were associated with less drinking at the one year follow-up point (though not at 6 month or 2 years).

One Month Treatment Outcome

In the one month group all subjects and informants reported improvement and no subjects were admitted for detoxification during the follow-up period. A stepwise multiple regression was performed using employment status as the criterion variable. None of the selected variables were significant at the point they entered the equation.

Treatment Outcome - Combined Male Groups

Table 45 presents the results of the canonical correlation for combined groups in which the individual's report, the informant's report, employment status, and admission for detoxification were used as criterion variables. The selected predictor variables for this analysis were age, religion, AA attendance, Si, Ad, Pa, Dy, Ma, Am, and number of months since completion of treatment. Cases with missing values were assigned a weighted score computed with the ratio of the total number of variables in the variate to the number of nonmissing variables in the variate. This technique allows the use of as much of the valid data as possible because a case is not excluded merely because it has a score on one variable missing.

The first canonical function had its highest correlations with the individual's report of chemical use in the criterion set and with the Holmes alcoholism scale (Am), the Hypomania scale (Ma), and religious preference in the predictor set. This function is most closely associated with self-reports of chemical use and improvement is related to being Protestant and having lower scores on Am and Ma (see Table 46).

Table 45

Canonical Correlation Combined Male Groups

Function	Eigenvalue	Canonical Correlation	Wilks' Lambda	χ^2	df	p
1	.81166	.9009	.09825	117.19	40	.001
2	.41501	.6442	.47390	36.22	27	.111

Table 46

Loadings on Canonical Functions for Combined Male Groups

Criterion Set			Predictor Set		
Variable	Function 1	Function 2	Variable	Function 1	Function 2
Chemical Use (Self-Report)	.307	.882	Time	.174	-.603
Chemical Use (Informant Report)	-.077	.899	AA Attend.	.104	.663
Employment	-.183	.566	Si	-.131	.228
Detoxification	.076	-.536	Ad	-.291	-.378
			Age	.320	-.051
			Religion	.352	-.044
			Pa	-.085	.126
			Dy	-.158	-.160
			Ma	-.617	-.421
			Am	-.625	.288

The second function had high positive correlations with employment status, informant reports, and individual reports of chemical use. It was negatively correlated with number of admissions for detoxification. In the predictor set, the second function was positively correlated with AA attendance and had negative correlations with number of months since treatment completion, the Admission scale (Ad), and the

Hypomania scale. This function seems to represent a global improvement factor. Improvement was associated with AA attendance, lower Ad and Ma scores, and recency of treatment completion.

A summary of this analysis indicates that improvement is associated with greater AA attendance, lower scores on Ad, Ma, and Am, and with being Protestant. This is similar to the earlier cited findings in this study that low Ad and Ma scores and AA attendance were positive indicators of improvement. The finding that being Protestant was correlated with improvement is consistent with the results of Armor et al. (1978). These investigators reported that Protestants were more likely to be abstainers, or if they drink, were less likely to be problem drinkers.

Tables 47 and 48 present the redundancy indices for the predictor variables and the criterion variables for the canonical functions of the combined group analysis. Approximately 24% of the variance in the criterion variables were accounted for by the predictors.

Table 47

Redundancy Indices for Predictor Set of Combined Male Groups

Canonical Function	Redundancy Index
1	.09513
2	.05415

Table 48

Redundancy Indices for Criterion Set of Combined Male Groups

Canonical Function	Redundancy Index
1	.02836
2	.21690

Treatment Outcome - Combined Female Groups

In this analysis, data for all females who had completed treatment during the period of this study was combined. The informant's report of chemical use and employment status were used as criterion variables and age, marital status, Si, Dn, Dy, and Am were the predictor variables. The resulting canonical correlation was not significant.

CONCLUSIONS

Summary

The most consistent prognostic indicator of improvement in Part II of this study was the Admission scale of the MMPI. Low Ad scores were associated with reduced chemical use and increased employment 12 months following treatment completion. When groups were combined for analysis, lower Ad scores were also associated with abstinence, reduced chemical use, and a global adjustment factor.

The Ma scale was also a good indicator of improvement. Low Ma scores were related to the individual's report of chemical use both at a 12 month follow-up and in an analysis of combined groups. In both cases this variable was associated with the self-report of chemical use, but not with any other outcome measures. Therefore, some kind of sampling bias may be operating. Perhaps subjects with low Ma scores are more likely to respond to this kind of treatment outcome questionnaire.

As in previous studies, attendance at AA meetings was a positive prognostic sign. More frequent AA attendance was related to reduced drinking and employment for both the 6 month and the 12 month groups. It was also positively correlated with the global adjustment factor found in the combined group analysis.

The Am scale was also a frequent indicator of improvement in this study. However, its status is not clear. High Am scores were

associated with improvement when the informant's report was used as a criterion. However, low Am scores were associated with improvement when the individual's report was used as a measure of improvement. This may indicate some kind of a bias characteristic of individuals who respond to treatment outcome surveys. Perhaps those with low Am scores are more likely to report improvement, even though collateral informants perceive them as improved.

Directions for Future Research

Further research with the Admission scale in other chemically dependent populations is certainly indicated. It was a consistent predictor of treatment outcome in the present study and deserves further investigation. This scale contains items concerning dizzy spells, fainting spells, headaches, balance, shaking of the hand, and other bodily complaints which may be associated with prolonged heavy drinking. Perhaps lower Ad scores are associated with improvement because those subjects are at a less advanced stage of alcoholism. It may be useful to study the relationship between the Ad scale and hard signs of chronicity in alcoholics to determine if that is the source of the scale's predictive power.

The status of the Am scale as a predictor of treatment outcome remains unclear and more research is needed to clarify its role in both individual and informant reports of improvement, as well as with different populations of alcoholics.

Additional research is needed to explore the relationship between personality variables and treatment outcome, not only with the

MMPI, but also with other psychological measures. There is also a need to explore relationships between the type of treatment, patient personality variables, and counselor personality variables. The ultimate aim would be to match the patient to the counselor and program with which he is most likely to be successful, or modify programs to be more responsive to individual needs.

OVERVIEW

There appears to be little consistency between the variables that were predictive of treatment completion and those that were related to positive treatment outcome. Conscious Repression (R) was the only scale that seemed to be consistent in this regard. Lower R scores were associated with treatment completion and also with reduced chemical use in the a priori analysis of the 12 month treatment outcome group. Because the R scale has seldom been used in alcoholism research, it is not clear whether these findings can be generalized to other populations or are restricted to the specific sample examined in this study.

The Social Introversion (Si) scale also appeared as an indicator in both parts of this study. However, its direction was not consistent. Lower Si scores were associated with treatment completion, while high Si scores were associated with improvement in the post hoc analysis of the 12 month group. Previous researchers have not reported a relationship between the Si scale and treatment outcome or treatment completion (Clopton, 1978). Therefore, the findings in the present study may be restricted to the specific population, or may be a statistical anomaly.

Although the Control scale was a consistent indicator of treatment completion, it was not prognostic of treatment outcome in any of the analyses. In a similar vein, the Admission scale was not a consistent predictor of treatment completion, but it was the most consistent indicator of treatment outcome.

One neglected area in alcoholism research concerns follow-up information on individuals who drop out of a treatment program. More research is needed to determine if they improve, deteriorate, or if they seek alternate sources of help after dropping out of treatment.

APPENDIX A

INDIVIDUAL QUESTIONNAIRE

GLENMORE PRIMARY TREATMENT FOLLOW-UP QUESTIONNAIRE

Glenmore is interested in keeping in touch with individuals who have undergone treatment at Glenmore. We have designed this brief questionnaire for you to fill out and mail back to us so that we might better serve you and others who receive treatment here. Please take ten minutes now and fill it out. Your responses will be kept in strictest confidence and only reported in group summary form. The questions refer to your treatment which ended _____.

1. How does your use of alcohol compare to that before your treatment at Glenmore (circle one)?

   a. I have not used alcohol since treatment.
   b. I have used alcohol but not as often as before treatment.
   c. I drink about as often as I did before treatment.
   d. I drink more often than I did before treatment.

2. How does your use of mood-altering drugs (other than alcohol) compare to that before your treatment (circle one)?

   a. I have not used mood-altering drugs since treatment.
   b. I have used mood-altering drugs but only as prescribed by my physician as medication.
   c. I have used mood-altering drugs but not as often as I did before treatment.
   d. I use mood-altering drugs about as often as I did before treatment.
   e. I use mood-altering drugs more often than I did before treatment.

3. For each of the following aspects of life, indicate how much it has improved or worsened since treatment.

Aspects of Life	Improved or Worsened Since Treatment (check one)				
	Much Worse	Some Worse	About Same	Some Better	Much Better
Relationship to God, Church and family pastor	_____	_____	_____	_____	_____
Feelings of Self-Worth	_____	_____	_____	_____	_____
Relationship with family	_____	_____	_____	_____	_____
Other Relationships	_____	_____	_____	_____	_____
Education and Training	_____	_____	_____	_____	_____
Employment	_____	_____	_____	_____	_____
Retirement	_____	_____	_____	_____	_____
Housing	_____	_____	_____	_____	_____
Legal Problems	_____	_____	_____	_____	_____
Health Problems	_____	_____	_____	_____	_____
Emotional Problems	_____	_____	_____	_____	_____

4. Compared to your life before treatment, how frequently have you maintained some kind of conscious contact with a Higher Power through the following means since treatment?

	More Often Since Treatment	About the Same	Less Often Since Treatment
Prayer	_____	_____	_____
Meditation	_____	_____	_____
Church Attendance	_____	_____	_____
Spiritual Counseling	_____	_____	_____

5. How often do you attend AA meetings at present (circle one)?

   a. More than once a week.
   b. About once a week.
   c. 2 or 3 times a month.
   d. About once a month.
   e. Less than once a month.
   f. I do not attend.

6. Have you participated in the following AA activities since leaving treatment?

	Yes	No
Led a meeting	_____	_____
Told your story	_____	_____
Did 12th step work	_____	_____
Sponsored an AA member	_____	_____

7. Do you have any problems and concerns that we can help you with?

APPENDIX B

INFORMANT QUESTIONNAIRE

GLENMORE TREATMENT FOLLOW-UP QUESTIONNAIRE

The Glenmore Foundation is interested in evaluating the effectiveness of its program and we have designed this brief questionnaire for you to fill out and mail back to us. When they first entered treatment, _____ named you as the person we may contact for evaluation data. Please take a few minutes now to fill out this questionnaire. Your responses will be kept in strictest confidence. The questions refer to treatment which ended in _____.

1. How does their use of alcohol compare to that before treatment at Glenmore? (circle one)

   a. Has not used alcohol since treatment.
   b. Has used alcohol but not as often as before treatment.
   c. Drinks about as often as before treatment.
   d. Drinks more often than before treatment.

2. How does their use of mood-altering drugs (other than alcohol) compare to that before treatment? (circle one)

   a. Has not used mood-altering drugs since treatment.
   b. Has used mood-altering drugs, but only as prescribed by a physician as medication.
   c. Has used mood-altering drugs, but not as often as before treatment.
   d. Uses mood-altering drugs about as often as before treatment.
   e. Uses mood-altering drugs more often than before treatment.

3. Is he or she presently employed? Yes No

4. If employed, how many days of work during the past month has he or she missed because of use of alcohol or drugs? _____

5. How often do they attend AA meetings at present? (circle one)

   a. More than once a week.
   b. About once a week.
   c. 2 or 3 times a month.
   d. About once a month.
   e. Less than once a month.
   f. Does not attend.

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